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Amateur Radio

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COMMUNICATIONS & TECHNOLOGY

OCTOBER 2001

CQ

Mobile Special!

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ink, K4III, of Sarasota, Florida, with
setup. Details on p. 32.

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Turning Power (in pounds)	1000	800	600	350
Brake Power (in pounds)	9000	5000	800	450
Brake Construction	Electric wedge	Electric wedge	Disc brake	Disc brake
Bearing Assembly/How many	Tripl race/138	Dual Race/96	Dual race/48	Dual race/12
Mounting Hardware	Clamp plate	Clamp plate	Clamp plate	Clamp plate
Control Cable Conductors	8	8	8	5
Shipping Weight (pounds)	28	24	22	14
Effective Moment (in tower)	3400 ft/lbs.	2800 ft/lbs.	1200 ft/lbs.	300 ft/lbs.

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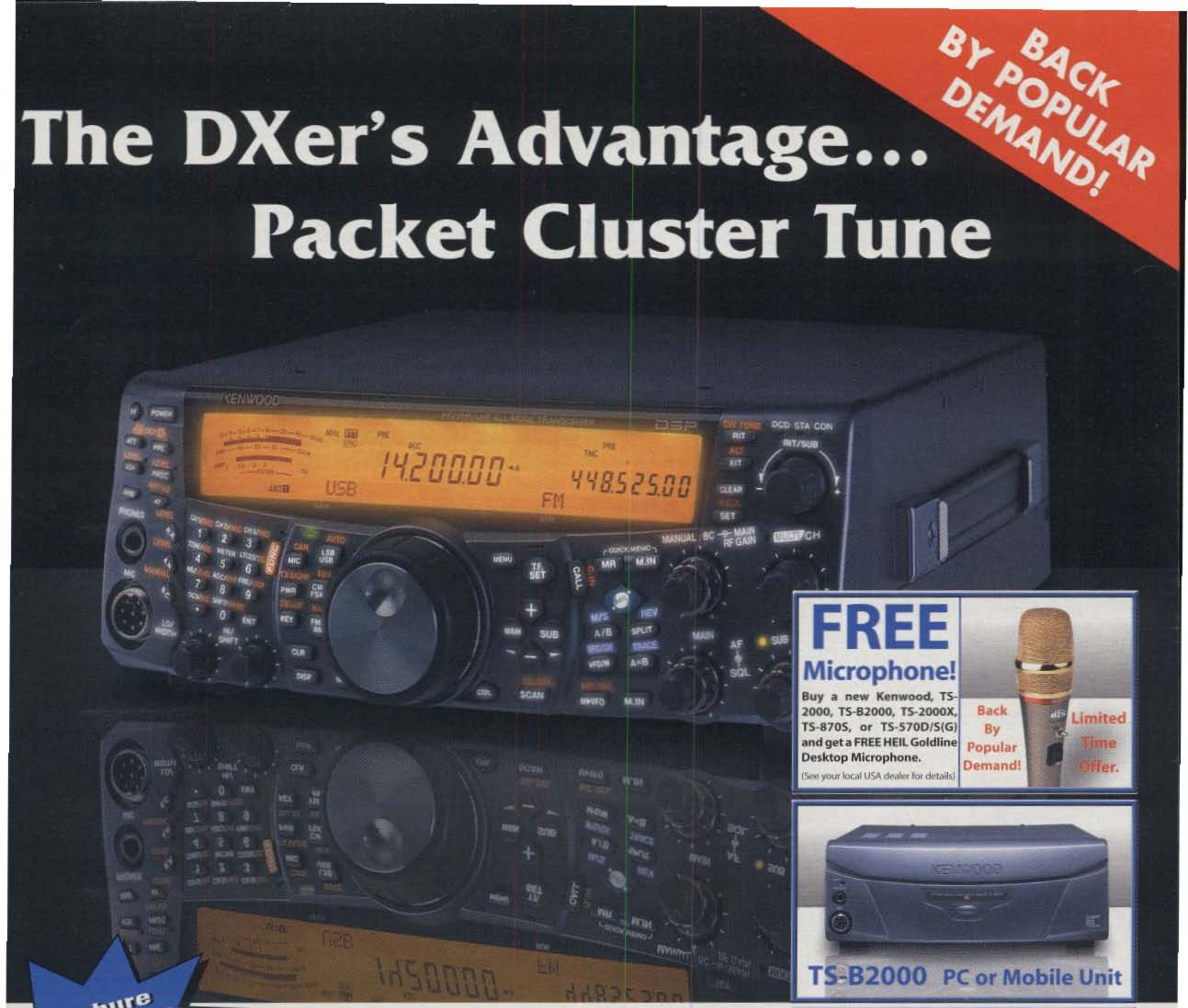

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Ham Radio News

From The CQ Newsroom

ARRL Takes Antenna Battle To Congress

The ARRL will seek federal legislation to give amateurs living in antenna-restricted private developments the right to put up antennas similar to those already mandated by Washington. The FCC has held that developments may not deny residents the right to put up antennas for receiving satellite TV or over-the-air broadcasts, but it has refused to expand that doctrine to include amateur antennas.

According to the ARRL, its Board of Directors voted at its meeting in late July to seek legislation in Congress to give amateurs the right to install antennas "having a similar visual impact" to a satellite dish or other antenna permitted for broadcast reception under current FCC rules.

Good News at Last for OSCAR-40

After a string of recent setbacks, controllers of the problem-plagued OSCAR-40 satellite finally had reason to smile, reporting in mid-August that the spacecraft's altitude control system appears to work. This system is critical to eventually deploying the satellite's solar panels, which are needed to provide full power for other satellite systems.

According to the ARRL, AMSAT-DL President Peter Guelzow, DB2OS, posted a message to the AMSAT internet bulletin board saying that initial tests of the three-part "momentum wheel" system for keeping the satellite pointing in the right direction had gone well. "We can say with some caution that we have a working three-axis control system!!!" wrote Guelzow, who had earlier doubted that the system would work following an apparent explosion aboard AO-40 last December.

The good news on the momentum wheels followed a report that the satellite's primary 2.4 GHz (S-Band) transmitter had stopped working, and that ground controllers didn't know what happened or why. That transmitter remains off as we go to press, but a backup transmitter on the band is still working.

AMSAT Details Plans For New Satellite

AMSAT-NA President Robin Haighton, VE3FRH, has announced preliminary plans for the amateur satellite organization's next spacecraft, and promised that the planning and design process will be completely open.

The initial plans for the satellite, known currently as "Project JJ," include SSB uplinks on 435 and 1269 MHz, with a single downlink on 2.4 GHz (the configuration OSCAR-40 is using right now); a digital voice (TDMA) uplink on 1269, with a downlink on 2400 MHz; a telemetry beacon on 2 meters; and if possible, no propulsion system to possibly malfunction. A target launch date was set for early 2004.

Haighton also reported in one of his regular "President's Letters" that "one very significant decision made was to make every aspect of this new satellite (as it is being designed) completely available to the AMSAT community ... every drawing ... every piece of code and all telemetry details..." He made exceptions for information which would possibly endanger the security of the spacecraft when in orbit, and for proprietary commercial data. Haighton also announced the kickoff of a fundraising drive for the new satellite.

PCSat to Put APRS in Orbit

A satellite that's already built and was scheduled for launch in early September is designed to expand APRS—the Automatic Position Reporting System—to a global scale. PCSat, built at the US Naval Academy by midshipmen working with APRS designer Bob Bruninga, WB4APR, is intended to demonstrate vehicle tracking for the Naval Academy and to provide APRS access to anyone on Earth with an APRS-equipped ham rig.

"We hope that PCSat will be a new direction for amateur satellites by serving the communications needs of travelers with only mobile and handheld radios anywhere on Earth," Bruninga told the ARRL. In comments to the AMSAT News Service, he added, "No ham traveler heading to the wilderness should leave home without his shirt pocket APRS handheld or other portable packet station." In addition to APRS messaging on 144.390 MHz, the satellite will offer 1200 baud packet operation on 145.825 MHz and 9600 baud packet on 435.250 MHz.

FCC Targets Part of 13cm Ham Band for Reallocation

The FCC has included a portion of the 13 centimeter amateur band—2390–2400 MHz—among a group of frequencies it is considering reallocating for advanced wireless services. This band segment is currently a primary amateur allocation.

In action taken August 9, the FCC requested comments on the possible reassignment of "some spectrum" in the 1910–1930 MHz, 1990– 2025 MHz, 2150–2160 MHz, 2165–2200 MHz, and 2390–2400 MHz bands for so-called third generation (3G) and future generations of wireless systems. The FCC news release announcing the action did not give due dates for comments. Generally, they are either 60 or 90 days after publication in the Federal Register.

The action comes on the heels of two competing petitions affecting ham radio's status on the 2300–2305 MHz portion of the band. The ARRL has asked the FCC to give amateurs a primary allocation there instead of its current secondary status (there is no current primary service), and a commercial firm called AeroAstro has petitioned for co-primary status with hams in order to put up a satellite-based position-monitoring system there. According to the ARRL, AeroAstro insists it can share the band with hams, but wants amateurs limited to 100 watts output for moonbounce work and 25 watts effective radiated power for other operations.

The ARRL responded to AeroAstro's petition by insisting that the satellite system would create "intolerable" interference for amateurs and said "it is time for the Commission to stop these (commercial) encroachments, because they have gone too far already." The League also pointed out that the FCC is already considering making an additional 80 MHz of spectrum available on nearby frequencies for the type of system that AeroAstro wants to operate.

FCC Seeks Comments on Possible 60 Meter Ham Band

While hams face possible frequency losses in the microwaves, there's a possibility of getting some additional spectrum on the HF bands. The ARRL says the FCC is seeking comments on a proposal to create a new US-only amateur band at 5 MHz. The ARRL-initiated proposal—designated by the FCC as RM-10209—calls for giving an amateurs a secondary allocation, for domestic use only, between 5250 and 5400 kHz, at an approximate wavelength of 60 meters. If approved this would be the first-ever US amateur band on which international communications were prohibited.

In its petition, the ARRL cited the need for an additional allocation to close what it termed a "propagation gap" between 80 and 40 meters, and would be particularly useful for emergency communications during severe weather. The League also said the new, 150 kHz wide allocation could relieve "substantial overcrowding that periodically occurs on 80 and 40." The proposal calls for the new band, if approved, to be open to all amateurs holding General Class or higher licenses, for

(Continued on page 54)

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[1] Note that certain frequencies are unavailable. [2] 5W output

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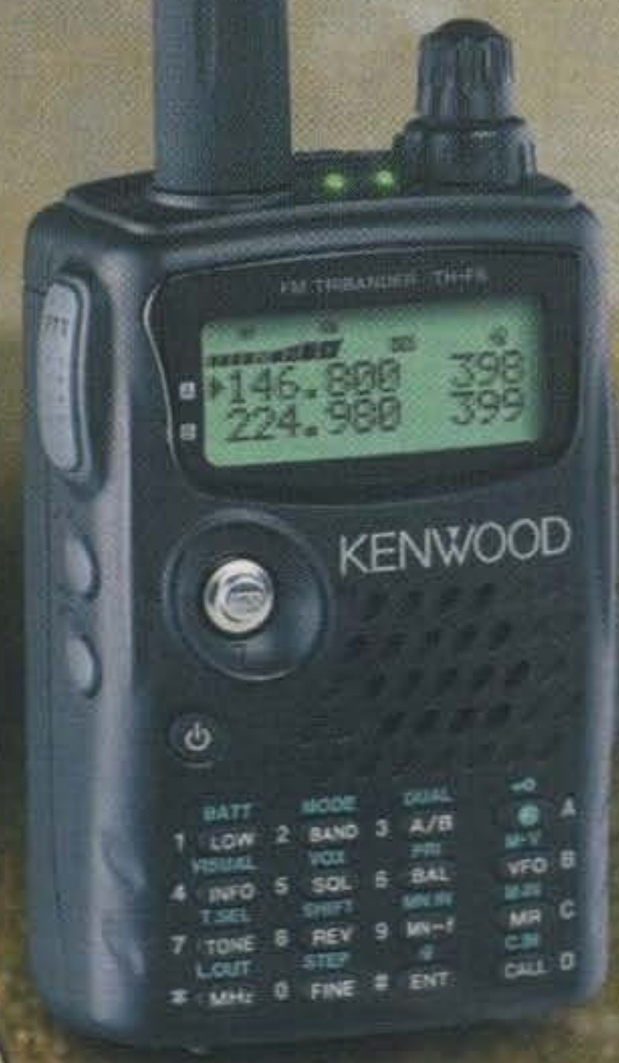

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Zero Bias

BY RICH MOSESON, W2VU

An Editorial

Hit the Road, Jack...

The open road... it's part of American culture, ingrained in our national psyche. Go new places, meet new people, do new things. We find it in movies, TV shows, popular music. Ham radio has always been a perfect fit for this part of our culture, letting us travel vicariously even when we can't hit the road on our own. The whole idea of DX is grounded in this concept, and DXpeditions take it a step further. Through our radios, we can reach out to people in faraway places. And some of us sometimes even get to *go* to these places.

One thing that sets apart radio from other hobbies, and other means of communication, in our mobile society, is that radio can go with us when we do hit the road. For all that wireless phones and the so-called wireless internet claim to free us from the umbilical cord of the telephone line, they don't let you wander too far off the beaten path. Last August, my daughter spent a few days with friends at their summer home in rural northeastern Pennsylvania, and I went up there to pick her up. My hi-tech digital cellphone had great coverage ... as long as I was on the Interstate. But within just a few miles of getting off onto the secondary roads, with no population centers or high-traffic corridors nearby, the coverage went from solid to spotty to non-existent. Until I reached a hilltop within range of the next Interstate about an hour later, my cellphone was useless. So much for freedom from the umbilical cord.

There are plenty of other hobbies, of course, that also play into our mobile psyche. But try driving your boat to the mountains (even if there's a place you can sail it once you get there, it's not much use while you're on your way), or flying a plane in your basement. Radio is a go-anywhere, do-anywhere, hobby. You can be at home, on vacation, or somewhere in between, and the radio is there for you. It doesn't tie you down to a specific location or type of location, nor is it an activity that you have to "go to." There are very few places where you can't tune in a radio signal from someplace else, or from which you can't send out a radio signal on some frequency and get a response. This portability is part of what makes radio such a valuable tool when other forms of communications fail.

On the Road with Our Radios

Radio has grown up with the automobile, and once the early technical limitations were overcome (such as providing consistent high voltages for transmitting tubes and getting beyond the need for a spark gap), hams began putting their rigs in their cars. The trend hit its first peak in the 1950s, driven (so to speak) by the growth of television and the resultant television interference (TVI). Those radio —primarily HF—were big and bulky, with big, bulky power supplies, and easily took up at least one passenger's worth of space. This first peak dropped off with improved TV receiver circuitry and the advent of single sideband, which, if not decreasing the interference, at least made it harder for the TV owner to figure out where it was coming from!

The next peak came in the 1970s and 80s, with the growing popularity of FM repeaters and solid-state VHF radios that now were small enough to go under your dashboard. The development of frequency synthesizers that freed us from crystal control made those radios useful wherever we drove (and spurred sales of the ever-popular *ARRL Repeater Directory*, which debuted in 1972). But generally speaking, they were still limited to keeping us in contact with hams in the general vicinity of wherever we happened to be. That peak dropped off in the 1990s, although VHF/UHF FM mobile rigs continue to be very popular.

Now, the third peak is building. Again, a combination of factors is at play. More and more hams live in neighborhoods with antenna restrictions that make it nearly impossible to put an effective home station on the air. Meanwhile, the state of the art in amateur radios is permitting manufacturers to pack more and more features into smaller and smaller packages, and detachable-head radios make it easier to wire up a rig even in cars that don't have an "under the dashboard" anymore. Plus, many of these radios operate on HF as well and VHF and UHF, making it possible to operate 160 meters through 70 centimeters from your car ... or even while out hiking or riding a bike. Mobile DXing is back in a big way, and bicycle/pedestrian-mobile DXing is making a big splash as well.

Our Mobile Special

With all this as background, we are pleased to bring you an issue packed with information on going mobile, from choosing an antenna to installing your rig to tips on mobile DXing. And we even go "off-road" with an introduction to pedestrian-mobile DXing.

Duncan Lindsay, EA5ON, gets us started with a look back at his first year of mobile DXing — working "DX in the Sun," from the coast of Spain. But his tips for success apply no matter where you are. Among our other "mobile special" articles, Jeff Francis, N0GQ, takes us hiking with ham radio and shares details of his "HFPack" station. Contributing Editor Gordon West, WB6NOA, examines the wide variety of HF mobile antennas on the market to help you decide which type is best for you, and frequent *CQ* contributor Danny Richardson, K6HME, offers a fascinating look at how the type of car you drive affects your signal pattern! QRP Editor Dave Ingram, K4TWJ, looks at the Yaesu FT-817, one of the rigs driving the operate-anywhere revolution, from a QRP-er's perspective; and Satellite Editor Phil Chien, KC4YER, checks in on the ham operations from the International Space Station, *really* mobile at 5 miles per second!

If mobiling's not your "thing," don't worry. We've got plenty of other good stuff as well. For example, VHF Editor Joe Lynch, N6CL, introduces us to a new mode for working meteor scatter—FSK441—and to WSJT, the computer program for it that's taking the weak-signal VHF community by storm (meteor storm?). Public Service Editor Bob Josuweit, WA3PZO, examines calls for ham radio backup help from a new quarter—internet leaders worried about increasing attacks on the 'net and hoping ham radio can provide emergency backup for that infrastructure just as it does for voice telephone and radio systems. Plus, for the experimenters among us, this month's "Math's Notes" shows us how to build a high-speed pulse generator on the cheap.

Radio Free Radio

Last month, I took the BBC to task for dropping its shortwave broadcast service to North America and the Pacific, in the misguided belief that its listeners are either always next to a computer with a fast internet connection or don't mind limiting listening to (generally) one hour a day of their programming rebroadcast in the US by mostly low-power FM broadcast stations. The bottom line is that, if you don't live close to one of these stations, or prefer to listen at a different time than the hour they've selected, you now have to pay (your internet provider) to lis-

ten to the BBC. At least they haven't taken the additional step pioneered this year by Major League Baseball of forcing you to pay a subscription fee in order to listen to radio broadcasts of baseball games on the internet.

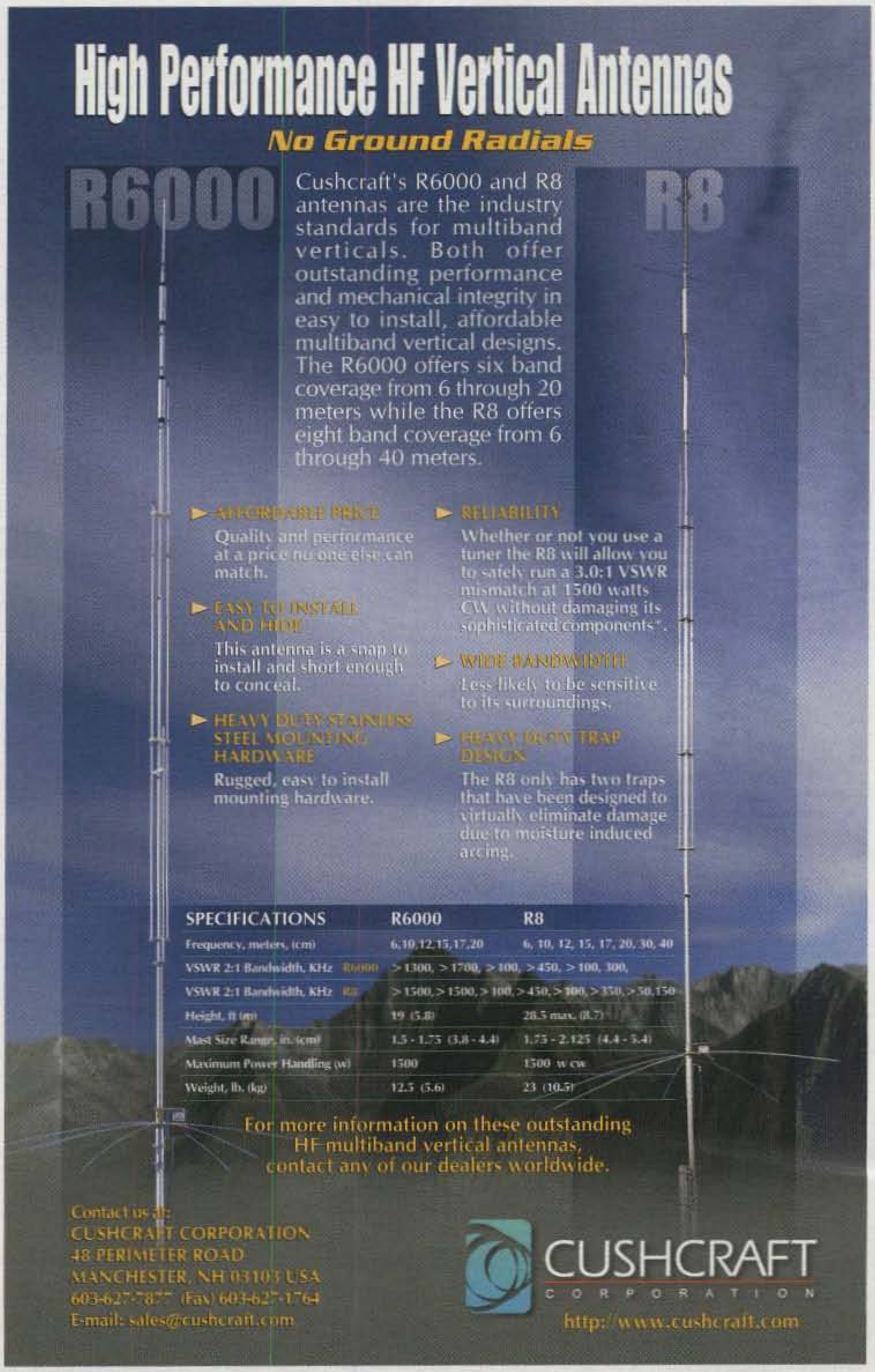
Speaking of Major League Baseball, here in the New York City area, the owners of the Yankees (along with the Nowhere Nets and NJ Devils) will soon be debuting their own cable network, which will carry all Yankees games as of next season (currently they're split between an over-the-air channel and a basic cable channel). Not only will they cut off all their fans who don't have cable, but depending on the outcome of negotiations with the major cable operators in the New York area, their channel may be offered only as a premium channel at $20-something a month. And you generally can't buy just one premium cable channel, you have to buy a package, for about $50/month on top of the $30-something "basic" cable rate. And don't even begin to think it'll be commercial-free because you're paying big bucks to watch it (This year, about half the NY Mets games were on a premium cable channel; the other half on over-the-air TV; the Yankees will simply be taking it a step further by removing all of their games from over-the-air TV). All that will be left for the "unplugged" fan is ... you guessed it ... radio. The reason I even bring this up is because of the family discussion that ensued after this arrangement hit the newspapers, with my son wondering if there's any way they can make you pay to listen to the radio! Thankfully, except for FM subcarrier programming that is sold on a subscription basis, the answer—for now—is no.

I hate to sound like one of those talk show hosts who tell you that as long as you share their beliefs, you're among the last defenders of freedom and democracy, but face it, folks. Radio is the last bastion of "free" communication, whether it's domestic AM or FM, shortwave, or two-way; voice or text. Talking to your friends or family members is easy on a cell phone (as long as you're not out in the boonies). Cha-ping! $$$. We hams can do it for free. "Instant messaging" is a highly popular way of typing to each other on the internet. Cha-ping! $$$. We hams can do it for free (we just call it things like RTTY and PSK31). Once you've invested in your station equipment, use of the airwaves is free. We have to remain vigilant to make sure it stays that way.

Changes Ahead

Moving back into the pages of *CQ*, you'll see a note at the end of this month's Propagation column that George Jacobs, W3ASK, our Propagation Editor for more than 50 years, will be handing the reins of the column over to Tomas Hood, NW7US, as of the January, 2002, issue. George is *not* retiring, and will remain on our masthead as Contributing Editor Emeritus. He will help Tomas get into the flow of the column and his highly successful methods of predicting propagation, and will contribute occasional feature articles on propagation and other aspects of ham radio. George and his wife have decided that they want to travel more, and a monthly deadline would interfere with that. So, with that, we welcome Tomas aboard, and look forward to many more years of having George share his knowledge and experience with us.

73, Rich, W2VU



Announcements

• **Call to Assist Solomon Islands:** The National Disaster Council of the Solomon Islands is collecting aids to teach 400 people amateur radio. Anyone who can help the country recover from the two-year war may contact and then send ham radio license training aids (books, videos (PAL format, radios, etc.) to Sam Voron, VK2BVS, 2 Griffith Ave., Roseville, NSW 2069 Australia (tel/fax 61-2-94171066) for transfer to the Solomon Islands.

• **The following Special Event stations are scheduled to be on the air in October:**

W3VPR, from 50th anniversary of Anne Arundel Radio Club, Davidson, Maryland; 1200Z Oct. 20 to 2000Z Oct. 21 on 14.240, 21.340, 28.440. QSL to AARC, P.O. Box 308, Davidsonville, MD 21035.

K3G, from 62nd anniversary of Coast Guard Auxiliary, US Coast Guard Base Philadephia, Pennsylvania; 1400–2200Z Oct. 20 on 7.270, 14.270, 21.330, 28.330 ±QRM. QSL via Dan Amoroso, W3DI, 196 Dam View Dr., Media, PA 19063.

W3KWH, from 60th anniversary of Steel City ARC, Pittsburgh, Pennsylvania; 1400–2200Z Oct. 6–7 on 7.260, 14.260, 28.360, 51.60, 144.160, 420.160. Certificate on QSL request from Steel City ARC, W3KWH, P.O. Box 281, Carnegie, PA 15106 (no SASE necessary).

W4BFB, from 20th anniversay of Discovery Place science museum, Charlotte, North Carolina; Mecklenburg ARS and Carolina's DX Assn.; 1400–2000Z Oct. 13 and 1600–2000Z Oct. 14 on phone, CW, PSK31 20 and 15 meters. QSL with SASE or certificate with 9×12 SASE (45 cents postage). DX cards okay via W4 bureau. Info e-mail: <ad4ie@arrl.net>, <www.cdxa.org>.

W4D, from Disney "100 Years of Magic," Disney World, Florida; Disney Emergency ARS; 1400–2400Z Sept. 30 and Oct. 1 on 7.265, 14.265, 21.365, 28.465, 147.300 MHz. For certificate send QSL and SASE (34 cents) to W3GU, 16589 Menorca Dr., Winter Garden, FL 34787; info <don.cwynar@worldnet.att.net>.

W7K, from 85th anniversary of Radio Club of Tacoma, Washington; 0000Z Oct. 20 to 0000Z Oct. 22 in the low end of each General class sub-band. Certificate to the amateur in each state and country who works the greatest number of club members. QSL also available. Send list to Radio Club of Tacoma, P.O. Box 11188, Tacoma, WA 98411 postmarked by Nov. 30, 2001. Details: <http://www.w7dk.org>.

W8E, from 62 anniversary of Coast Guard Auxiliary, Nashville, Tennessee; 1400–2200Z Oct. 20 on 7.285, 14.285, 21.370. 28.370. QSL to D.F. Stroup, 6095 Drumhill Lane, Milford, OH 45150.

Ø-land, from Nowhere, Kansas *(no call given—ed.)*; Douglas County ARC; 1400–2100Z Oct. 13 on 14.244 approx. primary freq., also 7.244, 21.365, 28.440 MHz as propagation allows. For 8×10 certificate send QSL and SASE to Kenneth Blair, KCØGL, 1711 W. 19th Terr., Lawrence, KS 66046-2549.

Ø-land, Anamosa Pumkinfest, Jones County ARC *(no call given—ed.)*, Iowa; 1300–1700Z Oct. 6 on 14.250 MHz±. For certificate QSL to Jim McClintock, NØCWP, 301 Vine St., Box 462, Morley, IA 52312.

KØS, from expedition to highest point in Kansas, Mt. Sunflower; Sand Hills and Trojan ARCs; 1800Z Oct. 20 to 1800Z Oct. 21 on 14.260, 14.035, 3.920 MHz and other General freqs. Certificate from Mt. Sunflower Expedition, P.O. Box DX, Colby, KS 67701.

WØCXX & **W5ROK**, from 2001 Collins Users Conference, Dallas, Texas; 1300Z Oct. 19 to 1900Z Oct. 21 on 7.260, 14.260, 21.360, 28.360. For certificate send QSL to Gene Duprey, K1GD, P.O. Box 10154, Cedar Raoids, IA 52410-0154. For more information: <www. dallasposse.org>.

*** The following hamfests, etc., are slated for October and late September:**

Sept. 27–30, **Microwave Update Conference**, Sunnyvale, California. For details see <microwave-update.org>.

Oct. 6, **RA of Greater Syracuse Hamfest**, Pompey Hill Fire Dept., west of Cazenovia, New York. Contact RAGS, Box 88, Liverpool, NY 13088 (phone 315-698-4558; e-mail: <ragsonline@hotmail.com>; <www.pagesz.net/~rags>. (Exams noon; talk-in 147.90/.30)

Oct. 6, **Northeast Kansas Ham Radio Swapmeet**, Jackson County Fairgrounds, Holton, Kansas. Contact Joel, K1CQ, 785-945-3763; e-mail: <k1cq@arrl.net>. (Talk-in 146.775 (–600), 146.52 simplex)

Oct. 6, **Temple (TX) Ham Expo**, Bell County Expo Center, Temple, Texas. Contact Temple ARC, P.O. Box 4511, Temple, TX 76505; phone WA5EQQ, 254-773-3590; e-mail: <hamexpo@tarc.org>; <http://www.tarc.org>. (Exams 1 PM; talk-in 146.820[–], PL 123.0 Hz)

Oct. 6, **Florida Crown Amateur Radio Convention**, Jacksonville North Campus, Florida Community College, Jacksonville, Florida. Contact Billy Williams, N4UF, P.O. Box 9673, Jacksonville, FL 32208 (904-765-3230; e-mail: <n4uf@nofars.org>). (Talk-in 146.7/444.4)

Oct. 7, **Illinois Valley ARC Swap Meet**, UFCW Union Hall, Beardstown, Illinois. Contact <bruce@jacil.org>. (Exams by reservation only via Tim Childers, 217-245-2061, <kb9fbi@arrl.net>; talk-in 146.715 w/103.5 Hz tone)

Oct. 13, **25th Mid-Atlantic States VHF Conference**, Trevose, Pennsylvania. *(See this month's "VHF Plus" column for details.—ed.)*

Oct. 13, **Tampa (FL) Ham/Computer Fest**, 4050 Dana Shores Drive, Tampa, Florida. Contact Keith Dean, 813-879-2449, e-mail: <kwdean@gte.net>. (Exams 1300Z; talk-in 146.940)

Oct. 13, **Hawaii State Amateur Radio Convention**, Rainbow Bay Community Center, Pearl Harbor Naval Shipyard, Hawaii. Contact Walt Niemczura, AH6OZ, <ah6oz@arrl.net> or phone 808-263-3872; <http://www.pilikia.net/karc/hamfest>. (Exams 0700–0900Z)

Oct. 13, **Oak Ridge Hamfest**, Fraternal Order of Eagles Bldg., Oak Ridge, Tennessee. Contact David Bower, K4PZT, 865-670-1503; e-mail: <d.bower@ieee.org>.

Oct. 13, **Lake Placid Hamfest & Computer Show**, Olympic Village, Lake Placid, New York. Check <http://www.geocities.com/nnyara>.

Oct. 14, **LCDRA & CMARC Hamfair**, The Summit, Dimondale, Michigan. Contact J. Ervin Bates, W8ERV, P.O. Box 27321, Lansing, MI 48909-7321 (517-676-2710; e-mail: <w8erv@arrl.net>). (Exams 517-589-5263 or <n8vys@voyager.net>; talk-in 145.390–, 146.529)

Oct. 19–21, **Pacificon 2001**, Sheraton Hotel, next to Concord's Buchanan Airfield, Concord, California. Information: <tickets@pacificon.org>; <http://www.pacificon.org>. (Exams; talk-in 147.06+ [PL 100 Hz])

Oct. 20, **Clear Lake ARC Hamfest**, Bay Area Community Center, Houston, Texas. Contact John Taylor, e-mail: <kd5iho@swbell.net>; <http://www.clarc.org>. (Talk-in 442.750, 146.640)

Oct. 21, **Kalamazoo Hamfest**, Kalamazoo County Fairgrounds, Kalamazoo, Michigan. Contact Charles Burgstahler, 6658 Carlisle Dr., Kalamazoo, MI 49009 (<charlieb@net-link.net>; <www.qsl.net/ka8blo/hamfest.htm>). (Talk-in 147.040)

Oct. 21, **Hall of Science ARC Hamfest**, NY Hall of Science, Flushing Meadow Corona Park, Queens, New York. Contact Stephen Greenbaum, WB2KDG, 718-898-5599 (evenings only); <wb2kdg@bigfoot.com>. (Exams 10 AM contact Lenny, W2LJM, 718-323-3464; <lmenna6568@aol.com>; talk-in 444.200, PL 136.5, 146.52 simplex)

Oct. 27, **St. Louis Halloween Hamfest**, Kirkwood Community Center, St. Louis, Missouri. Contact Steve Welton, phone 314-638-4959; <http://www.halloweenhamfest.com>. (Exams; talk-in 146.31–.91)

Oct. 27, **Greater Jacksonville Hamfest**, Morocco Shrine Auditorium, Jacksonville, Florida. Contact Bill, KE4HQG, <ke4hqg@aol.com>.

Oct. 28, **HamFest Iowa 2001, Iowa State Fairgrounds**, Des Moines, Iowa. Info Ron Ivers, KIØBW, 515-278-9945; <ki0bw@arrl.net; <www.hamfestiowa.com>. (Exams 9 AM; talk-in 444.575+, 146.82–)

Oct. 28, **Massillon ARC Hamfest & Auction**, Stark County Fairgrounds, Canton, Ohio. Contact Terry Russ, N8ATZ, 3420 Briardale Cr. NW, Massillon, OH 44646; <www.qsl.net/w8np>. (Talk-in 147.18+)

NEM Quad Developer WB2NEM, SK. Paul E. Smith, WB2NEM, of Kissimmee, Florida, the designer and developer of the NEM 2 meter quad antenna and several other HF and quad antennas, passed away on July 19 at the age of 71. He was also an Elmer to many hams. *(Information via his son, Dale Smith, N4TAQ)*

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DX in The Sun

A First-Year Experience HF Mobiling in Spain

BY DUNCAN LINDSAY,* EA5ON

Have you ever wondered just how well a mobile HF station works? I guess it's a thought that has crossed the mind of many hams at some stage or another. Much of the time the thought doesn't go any further than that. Some get as far as looking at brochures of rigs and antennas, and many install a V/UHF mobile, but very few actually set up a full-fledged HF mobile station.

Why Consider Going Mobile?

The reasons for wanting to go mobile vary widely. Some hams are constantly on the road—for example, truckers, sales reps, and the like. Some enjoy using mobiles from RVs while on holiday. Others want the challenge of operating from an "inferior" installation, similar to the challenge of QRP. Still others have difficulty operating a fixed station due to antenna installation problems, restrictive covenants, and so on. Then there are those like me—people who do not have time to operate from home and are hooked on DXing, so they find a way to get on the air through mobiling.

Take note, old timers. You had it good. The problems young parents of today face are different than those of a generation or two ago. With more and more working wives, there is more need for us husbands to share the load of the house and children. Although in my case it is a pleasure (ask anyone who has tried my rabbit in cider stew), it puts a big strain on available time for a hobby. My answer to this is mobiling.

Why Aren't There More Active Mobiles?

Why don't we hear more mobiles on the air? One reply to that question might be you don't hear them because the signals are so weak! Common knowledge dictates that when an antenna is shortened well below its physical length, it loses much of its radiation resistance and thus is less effective. Another factor that puts off a lot of people is installation, both finding a suitable place inside the vehicle for the rig and accessories, as well as drilling holes in the vehicle both for passing power cables to the battery and for antenna installation. Others do not fancy the extra cost of another rig and antennas, while some think of possible security and theft related problems. All in all, it might seem that a mobile station just isn't worth the bother.

A dream location for mobiling, with the 45 foot (14 meter) deep sea allowing low angle take-off. This is my regular lunchtime spot, but you don't necessarily need a location like this to work good DX.

It's Easier Than You Might Think

I went through all of the above problems. I spent ages looking at brochures and despairing at the price of rigs and antennas. I wondered how well these things would work. I also wondered how on earth I was going to get an antenna installed on my car without putting a hole in it, how I would power the rig without drilling through the firewall, and how I was going to hide the rig when it was not in use. What I eventually did was sit down and make a list of necessary and desirable factors for the station, and then tried to figure out whether or not I could afford them.

Rigwise, I would have liked to buy a separate mobile rig, but in the end I decided I couldn't afford it, so my TS-140S would have to double as a main station and a mobile. After

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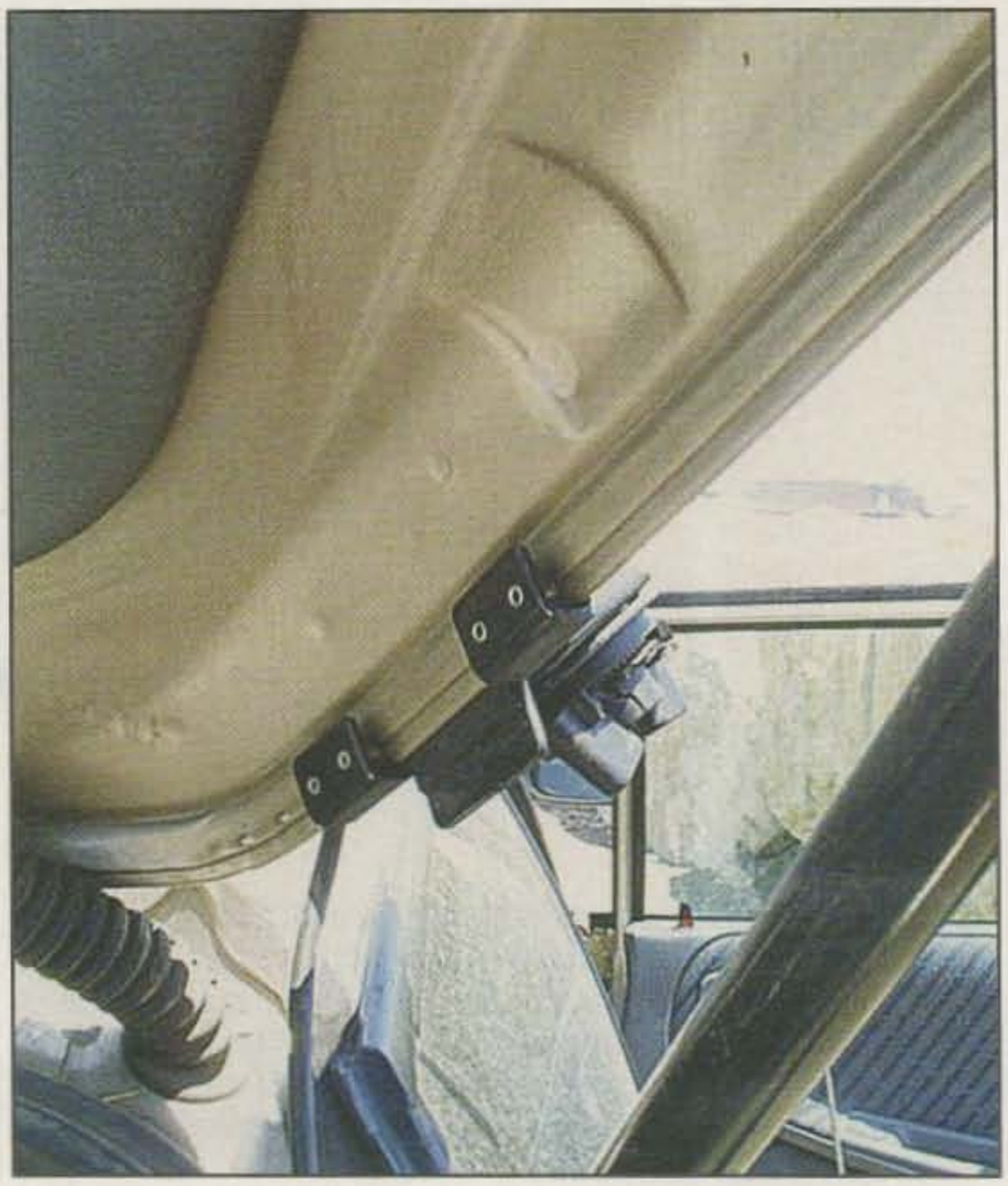
The fascia underneath the glove compartment screws off easily to allow firewall drilling. Beware—it takes time! Also remember to seal the hole properly once the cables are passed through.



The universal antenna mount fits snugly on most any trunk or door and makes a good earth connection when screwed in properly with the supplied Allen keys. Comet and Maldol advertise a similar type of mount in the U.S. →

carefully looking at the vehicle's firewall and not finding anywhere suitable to pass the DC wiring, I had a chat with my local Opel car dealer. He kindly showed me how to detach the cover under the glove compartment to reveal a space suitable for drilling. As far as the problem of installing the rig goes, I decided that I was not going to use the station while driving, the idea being that I would be operating at lunchtime while parked, so a fixed installation, which was going to be very difficult, was not necessary. The rig simply would be placed on the passenger seat so I could plug in power, antenna, microphone—and play!

Now for the really tricky part—the antenna. On my "necessary" list was an antenna that would be easily detachable and small enough to put in the trunk when not in use. All other features were put down as "desirable." I studied a lot of websites for information, but the antenna I finally bought was shown to me during a visit to my local ham dealer. The Nova Eco Veicolare is similar to the Hamstick® but is available here in Spain at a fraction of the price. I had gone to the store with the idea of looking for information, but I had seen so many antennas by that time that I knew as soon as I saw this one it was what I wanted. I walked out 20 minutes later with a set of five antennas and a universal base, leaving a set of WARC-band resonators on order. Total cost was about USD 140, half the price of the nearest equivalent.

For those of you who are not familiar with Hamsticks®, they are 7 ft. fibreglass sticks, top loaded and then helically wound to the base, with a 3/8 stud. The Nova Eco is a bit shorter—around 4–5 ft. depending on the whip. It comes with a spring mount, and I bought a universal mount which slips under the lip of my station wagon back door, the coax being thin enough to not be damaged as it passes through to the interior. The antenna also complies with my rule of being lightweight enough so as not to need a heavy-duty mount. The only disadvantage is the antenna needs to be changed every time you change band, but since I planned stationary operation that was relatively unimportant.

The Moment of Truth

The proof of the pudding is in the eating, they say, so after spending some time drilling away and installing power cable and antenna, I applied to have the installation legalized, as required by Spanish regulations. A few days later this was completed, and after tuning in the antennas with the small tuning whips on the top of each one, I proceeded to a beachside location near my place of work to try out the installation. A few calls and a PA (Netherlands) station replied, then a YU (Yugoslavia), and next an EI (Ireland)—all on 10 meters, with reasonable signals. I was, as can be imagined, very happy to be QSOing, especially with no interruption from family, telephone, neighbors, etc. The moment of truth was sweet. DXing in the sun with the sound of the waves in the background.

That was just the start, however. About a week later I made my first Brazilian contact. This was very special for me because it reminded me of a similar exercise many years ago when I was a CBer back in Scotland. My friend Ian Black and I had set off in his pickup to the hills behind my house with a 25 watt transmitter and a full-size half-wave vertical antenna strapped to the back of the truck. That day for half an hour in the pouring rain on a deserted grouse moor we called for a Brazilian station who never answered.

This time was very different. The sensation of finally having achieved the Brazilian contact from the mobile after so many years was very satisfying. Thereafter, the countries total continued to mount, until I got to the point of believing that DXCC from the mobile was possible. Not only was it possible, but I worked it in six months! Thanks to SY2A for number 100.

I guessed that my luck would have to run out at some stage, but no, I kept on going, and at some stage in March I realized that it might even be possible

to get to the magic 200 mark in the space of a year. At that time of year it's not all fun in the sun, though. I remember the day I worked PWØS, when the weather was just about as stormy as it can get, with waves washing over the 40 ft. (12 m) seawall behind me. I was trying on 15 meters when the operator announced a QSY to 10. I got out of the car and just about got blown off the dock into the depths below! By the time I recovered my balance I was smart enough to grasp the whips with both hands to change them over, and quick enough to change the VFOs and get him on the second call.

Yesterday, seven days before my first anniversary of mobile operating, I finally worked OY9 for number 200! To put this into perspective, I have a 4-element beam at home and have worked 252 countries—in 11 years!

Is There a Secret Or Can Anyone Do It?

There is no secret to working all this lovely DX, but I will let you in on some bits of information that make things a bit easier. None of them are new, but all of them are especially valid for mobiles:

1. *The way your vehicle is situated.* Although vertical antennas by definition work well close to the ground, remember that like any antenna, they will work better in an open environment. Also remember that proximity to salt water gives very low angles of radiation. If you live near the sea, try to take advantage of it. I am lucky in this respect since I work for a shipping company in the port of Valencia and have more or less free access to the port, with good take-off to all points. This certainly helps with long-haul DX, and it allowed me to work gems such as KHØ, VK9X, A5, FW, DU, BV9, and a host of others. However, it is by no means necessary, since I have also worked ZL, FY, P2, 5V, and lots of stateside when parked in my driveway with the antenna only 3 ft. (1 m) from the house. I worked 3YØC and BV from a nearby field, as well.

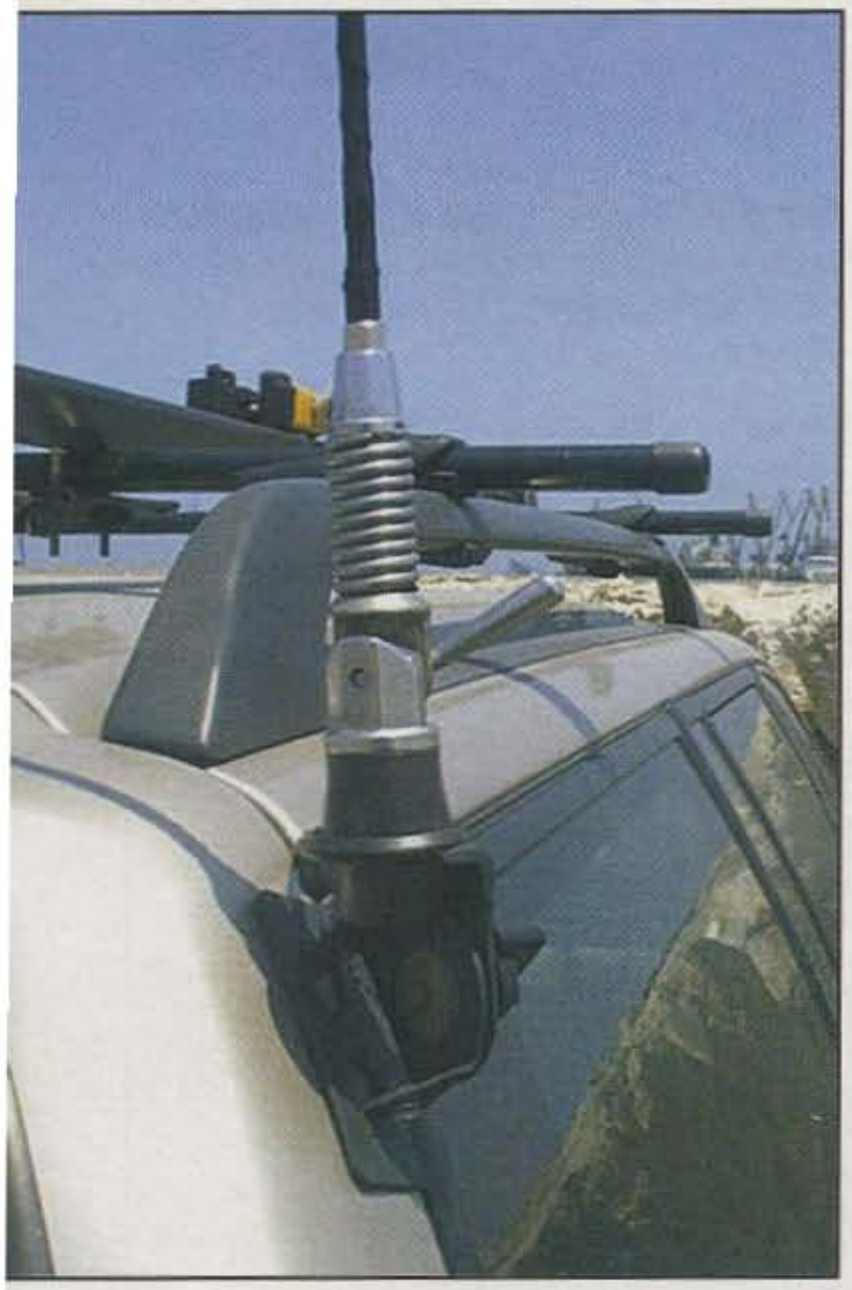
2. *Signing mobile.* DX stations are often amazed that they are hearing the "stroke mobile" in the pile-up and will make an extra effort to pull you through.

3. *Using propagation predictions.* Sometimes it's not worth your while to set up the station, or you would be better advised sticking to the low bands. I am signed up to IPS (*the Australian government's Ionospheric Prediction Service, although its official name is now IPS Radio and Space Service—ed.*) and receive a daily e-mail report. Look them up at <http://www.ips.gov.au/>. There are many additional propagation-related websites, and of course, there is *CQ*'s monthly "Propagation" column.

4. *The Cluster.* Take a look at the Cluster before you leave, either on packet or the internet. I am aware of the pros and cons of this service, but personally I think it is useful as an extra tool. I prefer the DX Cluster at <http://oh2aq.kolumbus.com/dxs/>. Take a printout with you to get an idea of what's happening. You may also find QSL routes there.

5. *Be informed of who's going to be on the air.* There are many good websites available, but my favorite is The Ohio and Penn site at <http://www.papays.com/opdx.html>. *(Of course, CQ's "DX" column is another excellent source of this information.—ed.)*

6. *Be on at a time when there is not much activity.* More often than not, what stops you from getting through is QRM from other stronger stations, but if you are in the clear, you will be heard.



Note that the universal mount has two adjustable screws so the antenna can be placed in the vertical position no matter where the base is installed. The antenna base also has an adjuster, as well as a heavy-duty spring to avoid stress on the mount while driving. My wife has tested it to 100 mph (160 km/h) with the 15 meter whip without any problems.

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RT-936	9.0	43.75"	36"	18 sq. ft.	130 lbs	54	$396.95
RT-1832	17.5	37.62"	32"	12 sq. ft.	110 lbs	62	$531.95

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Nothing fancy inside. The rig just sits on the passenger seat, allowing quick connect and disconnect. This works for me because I only operate when the car is stationary.

Therefore, avoid weekends if you can, and go for weekdays during the day, lunchtime included. DXpeditions are often heard calling CQ with no reply at these times, only to be snowed under when people get home from work in the evening, and especially on weekends.

7. *Get on the air even if you only have 5 minutes.* As an example, I was coming back home with my kids one day and decided to stop in the supermarket parking lot. I hitched up the rig, screwed on the whip, and switched on to hear "D44BC QRZ?" from Cape Verde. My EA5ON/M was replied to immediately. I logged the contact, unplugged the rig, and continued on my way. It was not more than 90 seconds start to finish for another new one.

8. *Call CQ.* Just because you can't hear anyone doesn't mean the band is dead. CQ calls on apparently dead bands have netted me Z2, 9V, and 5N as "new ones." This same principle applies to stations you can hardly hear. I netted A5 and OY with barely audible copy, but they heard me fine. *(This last tip is valuable for any sort of operating. Many a band opening has been missed, especially on the higher HF bands, because everyone is waiting for someone else to call CQ.—ed.)*

What Does the Future Hold?

As in fixed station operating, there comes a time when new countries start becoming few and far between. Fear not, however, as there are always fun things to do. My plans for the future include a project for a telescoping, full-size quarter-wave antenna for 10–20 meters made from aluminum tubing, and low-band dipoles using a telescoping fishing rod as a support (this project is underway). I would like to try out magnetic loops and those funny-looking Isotron antennas. An amplifier would be nice, when funds permit (i.e., in at least five years). When I move back to the city next year, I will look at motorcycle mobile, and maybe improve my CW a bit and do some mobile CW. There are many possibilities.

I also hope that one of these days I will be able to participate in a contest without the appearance of Murphy. In last year's CQ WW SSB I was unable to work anything, since the weekend coincided with a long-planned trip to the beautiful historic town of Albarracín. Nevertheless, on Sunday afternoon and after a sumptuous lunch in a village on the way home, the rest of the family and friends decided to take a walk. I excused myself, with the aim of making a few contacts. The restaurant was on the outskirts of town, so I decided to go around the back and get an unobstructed takeoff angle to the west. I turned off the track to turn around in a field, when all of a sudden I got that sinking feeling! I had forgotten that it had rained extremely heavily only a couple of days before, and what would normally be a hard-baked field was now a marsh in disguise. Some quick thinking and help from the waiter saved me from having to call out a crane or a tow truck, but by the time I was back on the tarmac, my family had returned, curious to know what the locals were all looking at. Not one single contact in the log!

CQ WPX wasn't a lot better. I decided on a location on a small hill near my house, where one can access the summit by way of a small track. Half an hour later I was heading home again after I noticed one of my tires losing pressure rapidly. It seems that I had hit a sharp stone! At least that time I managed to get HC8 (Galapagos) in the log before disaster struck.

Summary

This article does not attempt to be the definitive thesis on mobile operation. It rather is a summary of my first year of mobile operation. I hope it will help anyone who has thought about going mobile but has not done anything about it because he or she thought it was too tricky or not worth the bother. A quick surf through some of the websites in the "Resources" box will confirm what I stated above: HF mobiling can be inexpensive, easy, and above all surprisingly good when compared with your base-station setup. Try it!

Acknowledgements

Thanks to Ana Gijón for helping with the digital camera. Also, my thanks to all those who have patiently listened to my ravings and still given me their full support, especially EA5DFV. Many thanks, José Miguel! ■

Resources

For those of you who got this far and want to know more, here are some pointers:

- A good general book is the ARRL's *Your Mobile Companion.*
- Don Johnson's book *40 Years of Mobileering* has recently been re-edited, but I am not aware of where it can be purchased.
- *The Mobile DXer* is a new book published by CQ Communications which I hope to read soon *(see the ad for the book in this issue—ed.).*
- On the internet there are many sources of information for mobiles:

<www.hamstick.com> for the Lakeview Company's Hamstick antenna
<www.hsantennas.com> for the High Sierra Screwdriver antenna
<www.spiderantennas.com> for the Spider antenna
<www.texasbugcatcher.com>for the Texas Bug Catcher
<www.eham.net> for a large number of user reviews and summaries of commercially available equipment

- Additional Links

<www.k2bj.com> for "HF mobile's home on the net," especially recommended is the antenna section with comparative reports
<www.outbacker.com.au> for the Terlin Outbacker antenna
<www.cometantenna.com> for universal mobile mounts and other mobile antennas
<www.rfparts.com/diamond> for the Diamond line of mobile antennas and mounts
<www.radio-alfa.com> the Spanish distributor for Nova Eco antennas

This is just a small selection of the many possible sites for further information.

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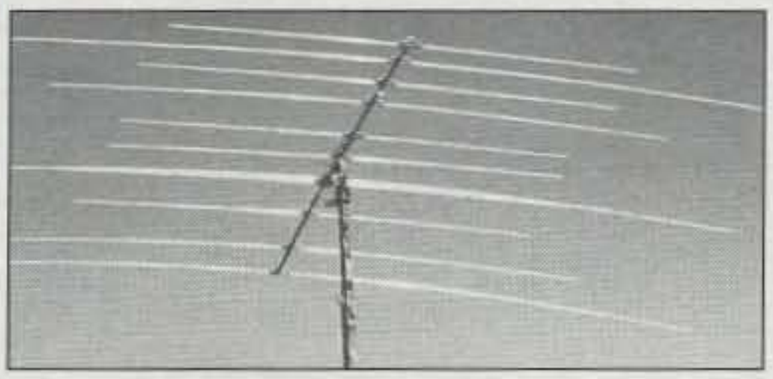

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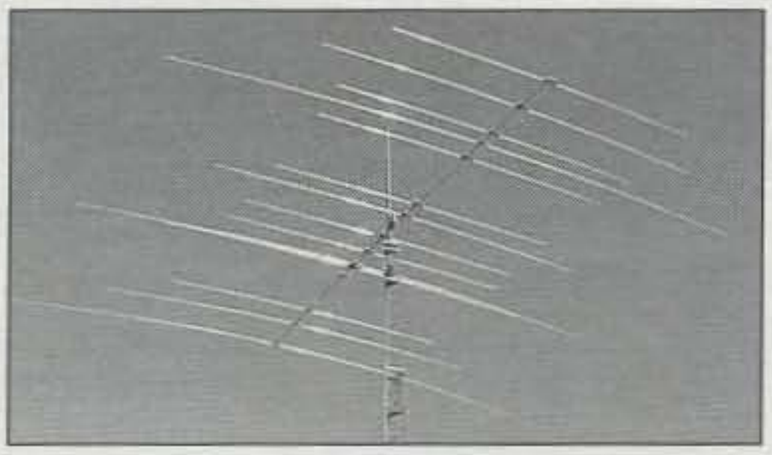

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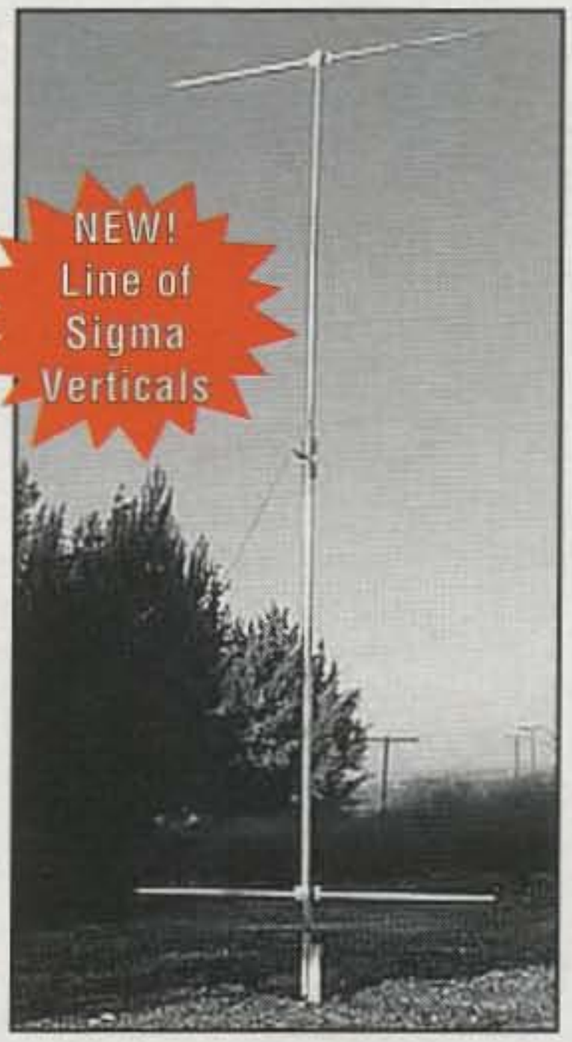

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It used to be that "mobile" on HF meant operating from your car or truck, and even that was pretty unusual. Actually, it still is, but today's tiny HF rigs let you keep DXing even without wheels.

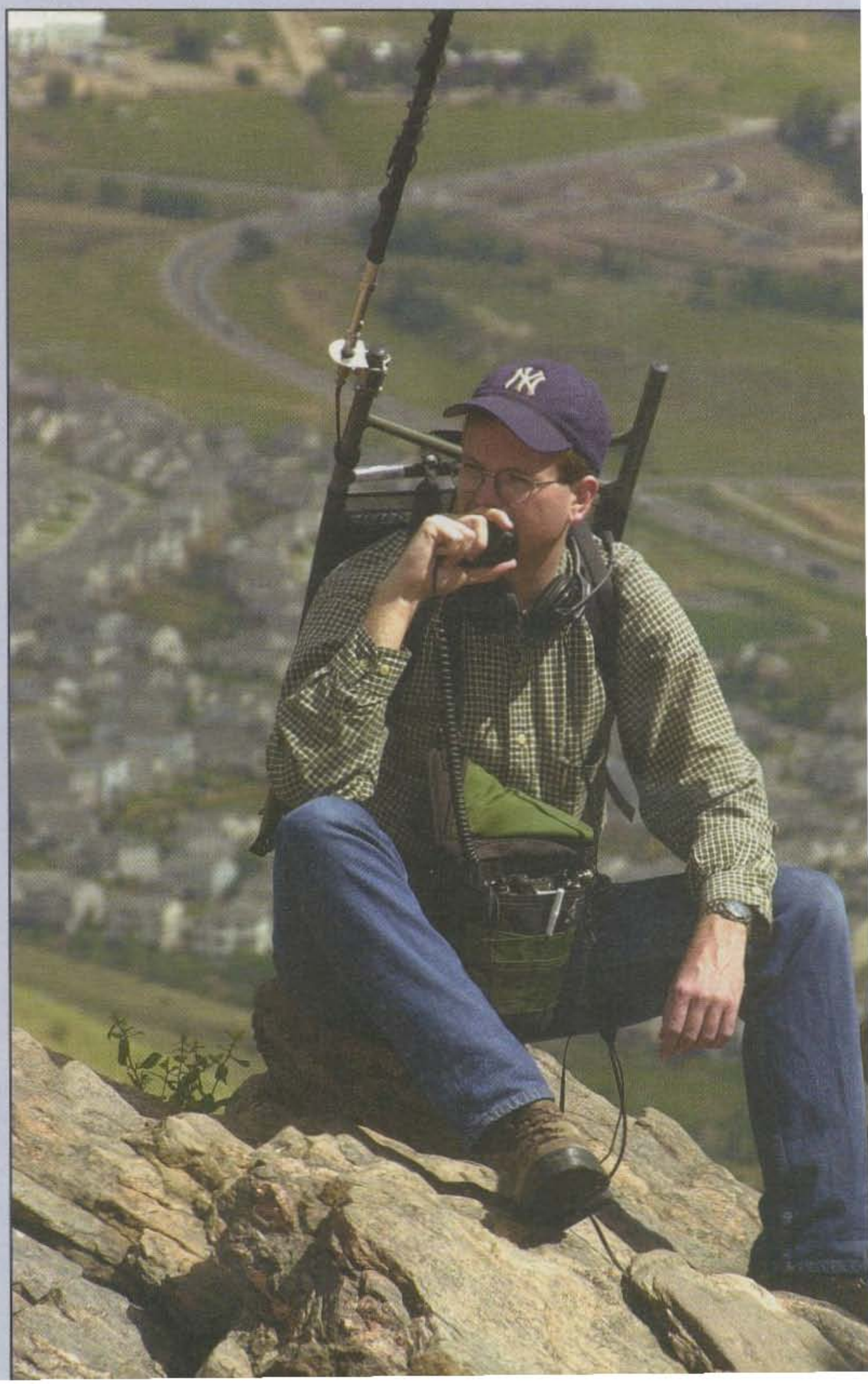
DXing on Foot
Operating Pedestrian Mobile

BY JEFF FRANCIS,* NØGQ

"Okay NØGQ/PM, you're 5-by-5 here in New Jersey, and the name here is Karen. I'm sorry, you said you're 'what' mobile? What's the 'P' in 'PM' stand for?"

This is a pretty typical reaction to the announcement on HF that you're "Pedestrian Mobile." If you've been active on the air for any amount of time, there's a pretty good chance that you've worked someone who's aeronautical mobile, maritime or marine mobile, or just regular ol' automobile mobile. Even satellite and astronaut contacts are common enough that they don't raise many eyebrows anymore. Pedestrian mobile, though, often will generate enough of a pile-up to impress even the most jaded hams. I'd be willing to bet that more ham radio operators talked to the Heard Island DXpedition than have talked to an operator carrying an HF station on his or her back.

Operating pedestrian mobile is not a new concept. World War II had its fair share of HF operators on foot, and there have been others down through the years, mostly in the military. The modern western military, though now relying heavily on satellite communications, still finds uses for that old stand-by, HF. The current interest in operating on foot seems to stem from a number of factors, all occurring at just the right time: the booming popularity of QRP, increasingly restrictive neighborhood covenants, a love of the outdoors, the internet, and someone to bring it all together. That person is Bonnie Crystal, KQ6XA.



Taking mobile operating to new heights...and places you can't reach by car...the author operates HF from a mountaintop above Golden, Colorado. (Photo by Larry Mulvehill, WB2ZPI)

**7165 West Kentucky Drive, Apt. E, Lakewood, CO 80226*
e-mail: <n0gq@n0gq.org>

All packed up and ready to go. The author's FT-817 is neatly packed in a knapsack for easy access while walking or hiking. (NØGQ photo)

Bonnie started the HFPack mailing list in late 2000. The charter of the group could be summarized as "take your radio outside and have fun with it." Since the start last year, the group has gathered over a thousand members as of the time of this writing (late July).

Many hams feared the internet would be the death of ham radio. As seems to be the case over and over, though, the internet is not so much in competition with ham radio as it is an "amplifier" for bringing together people and information. The HFPack group spans the globe and includes members who enjoy operating home stations, automobile mobile, aeronautical mobile, and bicycle mobile. However, what the group finds the most interest in is pedestrian mobile. Members of the group have designed and built a number of innovative stations. For example, Budd Drummond, W3FF, designed a hand-carried dipole for the higher HF bands which the group has dubbed "the Buddpole" in his honor. Bonnie designed a very odd-looking, but very effective dipole for backpack mounting.

There are multiple informal nets on the weekends where the group meets to chat and test new antenna designs, and it's a rare day when you call "CQ HFPack" on one of the adopted frequencies and you don't get a response from another member of the group. (See box with HFPack recommended frequencies.)

A Mad Scientist's Delight

Designing and building an effective HF station that can be used while walking is quite a feat. Everyone knows operating HF mobile from your car is a significant step down from even a simple dipole in your backyard. Now imagine going down a few steps from even that and coming up with a station that can work effectively as you hike through the woods or stroll down the street. It can be done, though, and it's often surprisingly easy to work DX when the bands are favorable. The reaction of a DX station (or even a local station, for that matter) upon hearing you are running half a watt into a hand-held antenna using a radio running on flashlight batteries is something that should be experienced by every ham at least once. Utter disbelief is usually followed by at least 30 minutes of questions, and often a whole raft of operators who want their chance to talk to "that guy on foot." It's not often that the average ham gets to be on the fun end of a pile-up, but operating /PM will often give you that opportunity.

Just as with home stations, the antennas choices fall into two basic categories: horizontal and vertical polarization. A number of members have constructed the W3FF Buddpole from the plans on Budd's web page and have had excellent luck with it. I live in Colorado, where we have trees. Lots and lots of trees. Trying to hike among trees with a hand-held dipole is a recipe for aluminum spaghetti, so I went the other direction and I use a vertical antenna. The trade-off is that I have to trail 20 or 30 feet of wire behind me as I walk to act as counterpoise. I've tried several antennas, including two different 102 inch CB whips and an Outbacker Perth Plus. Overall, I'm happiest with the Perth Plus. It's shorter, and therefore more manageable than the 8 foot whips, and pretty close to equal in performance, at least on 17 through 10 meters. I expect single-band Hamsticks® would work equally well.

The next choice to make is deciding how you're going to carry everything. If you're going to use a hand-held dipole, a good solution to carry your radio and batteries might be a knapsack or shoulder bag of some type. Carrying the radio in a backpack makes things simple, but of course you can't easily change frequencies or read the S-meter. I use a combined approach. Since I chose the vertical antenna over the dipole, I searched garage sales and army surplus stores until I found an aluminum backpack frame without the nylon pack (of course, you could always simply remove the pack from the frame). I mounted a 3/8 × 24 mirror-mount antenna bracket to the top of the pack frame, and attach various antennas by means of quick-disconnect fittings. This makes it simple to reach up and detach the antenna with one hand, either for retuning to a different band, or to walk under trees or brush on which the antenna might snag. I carry the radio in a shoulder bag that hangs down by my side, and I can make adjustments in frequency, power, and volume when necessary.

Finally, a choice of radios must be made. The recent explosion of QRP and and almost-QRP compact radios gives you a wide variety of equipment from which to choose. While the size and features of the radio are important, current consumption and weight play the most important roles in this decision. Remember you have to carry enough battery power with you to make the trip worthwhile.

Current consumption eliminated quite a few choices, including my battered but much-loved IC-706MkII. The K2 and SGC2020 are excellent choices, both with a bit more power than "official" QRP (5 watts), but still very small and lightweight with low current consumption. "Green Radios" (i.e., army surplus radios) such as the PRC-1099 are also popular, as military manpacks often have built-in batteries, antenna tuners, and rugged antenna mounts. There are also several commercial manpacks available, such as the Yaesu VX-1200, which is not sold in the US. I chose the Yaesu FT-

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Alternate calling / USB: 14342.5, 21437, 24977, 28337 kHz
IARU Region 1/3 / LSB: 3688, 7088 kHz
IARU Region 2 / LSB: 3998, 7248
Data (center freq.): 10137, 14097, 18107, 21107, 24927, 28107 kHz

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1630Z: 18157 kHz / Alt 14342.5 kHz
1700Z: 28337 kHz / Alt 21437 kHz
Sunday UTC (Pacific, Americas, Australia, Asia)
0100Z: 28337 kHz / Alt 21437 kHz
0130Z: 18157 kHz / Alt 14342.5 kHz

Frequency info courtesy HFPack website.

817 for my /PM station. The FT-817, while lacking the ultra-low power consumption and extraordinary receiver quality of the K2, is considerably smaller and offers 6 meters, 2 meters, and 70 centimeters, which I felt might be valuable while hiking in the woods or on an emergency call-out. Of course, it also helped the decision that I have owned an FT-817 since late last year, and have been extremely happy with it.

Rounding out the station is a 5 aH gel cell which is strapped to the bottom of the pack frame with bungee cords, and a lightweight LDG Electronics Z-11 automatic antenna tuner. I added the tuner after a number of trips to the mountains where I had SWR problems. In theory, an antenna tuner should not be necessary if you are using an adjustable antenna such as the Perth Plus. The reality, though, is that as you hike, you travel over huge variations in the ground below you, and constant retuning of the antenna by hand takes all the fun out of the hike. The auto-tuner allows you to simply key up and talk without worrying about the details. The loss in radiated power seems to be overwhelmed by the other losses inherent in using such a poor antenna/ ground setup, anyway.

In spite of the staggering losses in the antenna system, remarkable success can be achieved. My favorite contacts are those with other /PM stations, particularly our DX HFPack members. One Saturday afternoon I was running 5 watts on Kenosha Pass, near South Park, Colorado, and I talked with Bonnie (KQ6XA) while she was standing on the Golden Gate Bridge in California. Later that same afternoon, I talked with NØKZ on top of Pikes Peak (about 100 miles south of me), both of us using 500 mw to a backpack-mounted vertical with S9 quality signals

The Men with Nets

Fair warning, before you go assemble a station of your own: HFPacking is addictive—very addictive. I own several very nice HF radios, yet on weekends I find myself operating my backpack station almost exclusively. The challenge of making contacts makes success very rewarding. It's also an area of the hobby where there is plenty of room for new innovations and lots of things to build and experiment with.

PM stations can always benefit from a tweak or change here and there. My station has evolved substantially over the last few months, and I seem to make at least one small change after every trip. I even tried VHF mobile in a recent contest, just to see how it would work. I had reasonable success on 6 and 2 meters and 70 cm SSB with an aluminum hand-held satellite antenna.

My latest addition to the backpack setup was to add a 2 meter vertical, a GPS receiver, and a Kenwood TH-D7A(G) for APRS. I then use the bigger 50 watt radio (a TH-D700) in my pickup as a digipeater to get my tiny 2.5 watt APRS signal to the rest of the world when I'm in the woods. I even tried moving the antenna, tuner, batteries, and radio to my bicycle to try bicycle mobile. Personally, I found bicycle mobile didn't suit me well, since everyone was always complaining I sounded like I was out of breath. Maybe a little exercise is in order before I try that one again.

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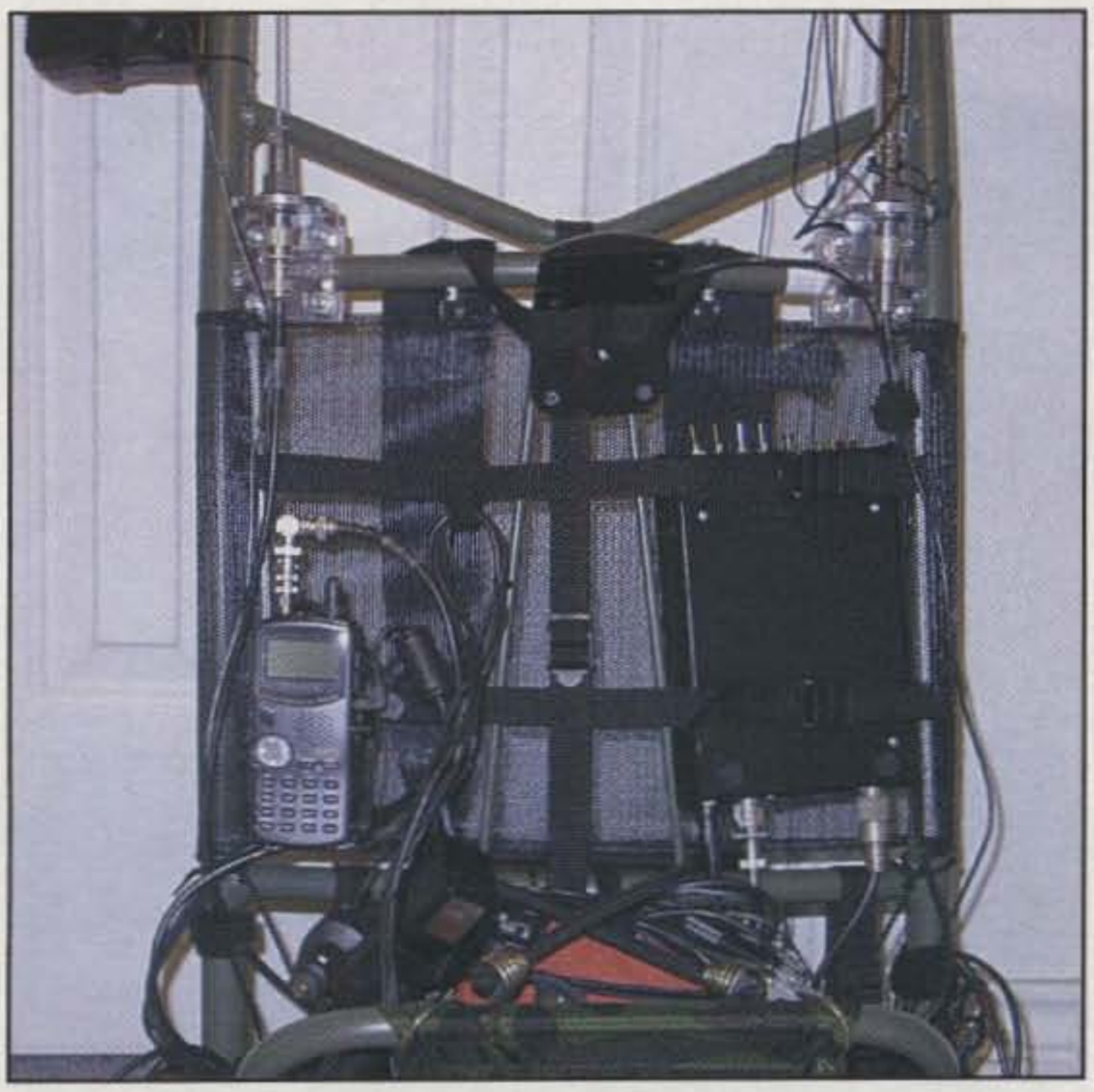

The author's backpack frame (minus the pack) set up for HF and VHF operating on foot. Antennas are attached at the top, plus a VHF handheld and an LDG Z-11 autotuner for HF work (see text for details). (NØGQ photo)

of a rolled-up dipole would allow for NVIS (Near Vertical Incidence Skywave) operation out of deep canyons or other rugged terrain for emergency communications where repeaters can't reach. Five watts and a dipole at chest height are quite effective for NVIS. A reasonable-size battery will give many hours of service at 5 watts.

Safety

Several recent tragic deaths serve to remind us that ham radio can at times be a dangerous hobby. A trailing counterpoise wire can snag at just the wrong moment and pull you off balance, or an aluminum vertical antenna could easily come into contact with power lines. Don't forget you've just made yourself into a human lightning rod. It's a fun hobby, but remember, it's just that—a hobby. Be safe.

Conclusion

The next time you see a frame pack at the neighborhood rummage sale, buy it. Scrounging up the rest of the gear isn't hard or expensive, and you'll soon have a whole new facet of the hobby to enjoy. Even a heavy radio that needs a large battery can be fun for a short walk around the block. I'm finally even starting to get used to the stares and comments from my neighbors as I test each new idea. ■

Resources

HFPack web page: <http://groups.yahoo.com/group/hfpack>
NVIS information: <http://groups.yahoo.com/group/NVIS>; also see CO2KK's "Antennas" column in the May 2001 *CQ*.
APRS information: <http://www.aprs.org>
W3FF dipole: <http://www.qsl.net/w3ff/W3FF_5.htm>
Packs custom-designed for carrying ham rigs are available from Cutting Edge Enterprises, <http://www.powerportstore.com> (also see their ads in *CQ*)

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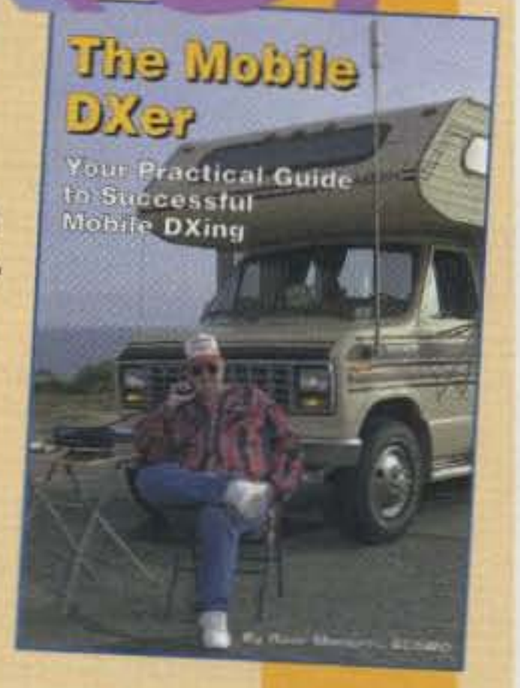

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Looking to get into mobile DXing? You have a great number of choices, both in radios and antennas. WB6NOA looks at the antenna choices and at which one may be best for you.

HF Mobile Whips Put to the Test

BY GORDON WEST,* WB6NOA

Operating HF mobile is one of today's fastest-growing ham radio activities, fueled by growing restrictions on traditional operating and the availability of a wide variety of small, 12 volt, DC-powered HF radios.[1] However, the rig is only half the station. The other half, of course, is the antenna.

There are approximately 15 different commercially-manufactured mobile high-frequency whips that terminate into 3/8" × 24 threads to screw into about 10 different type mounts on your vehicle. Some of these whips are intended for single-band operation, a few may take add-on coils for multi-band operation, a couple are motorized, and a few offer continuous and adjustable loading. Probably the big difference among them all is whether they are relatively lightweight and easy to mount or are heavy, requiring a hefty base receiver with the 3/8" × 24 female threads. (The Yaesu ATAS-100 and Comet HV terminate to the common SO-239 jack.)

The objective of our test was a review of what is available for high-frequency operation that will put out a decent signal from a mobile. The antennas we tested may *not* be the ultimate in putting out the maximum HF signal. Those mobile antennas are in a relatively expensive class by themselves and may require massive bottom brackets in order to hold the big coil and capacity top hats, plus any motor-driven tuning system near the base. There is no question that these larger, *serious* high-frequency mobile antenna systems indeed put out stronger signals, especially on the longer wavelength bands such as 40, 80, and 160 meters.

Our review will break up these mobile HF whips into three categories—short and lightweight, traditional 6–7 footers, and taller 10–11 footers that must be mounted lower on the vehicle to stay under the 13 1/2 foot highway height limits (for getting under bridges on interstate highways).

Lightweight Shorties

The Antenna World short-shaft, high-frequency whips (one for each band) can easily fit into a suitcase if you need to take them on a road trip. The fiberglass lower shaft is just 2 feet long, center-loaded to drive the current into a flexible yard-long whip. The loading coil has nice, heavy wire, and the shaft seems strong enough to tangle with almost any tree—quality construction.

From Comet, the extremely lightweight UHV-6 antenna, which terminates to an SO-239 mount, and Diamond's new HV7-A both let you operate 6 meters, 2 meters, and 440 MHz,

Today's mobile HF operator has a great number of choices in size, style, and type of antenna.

plus they allow you to add four lightweight HF coils to work, let's say, 10, 15, 20, and 40 meters. These are extremely lightweight, super-flexible mobile antenna systems, and they perform well on HF with the loading coils getting only mildly warm after a few minutes on voice transmit. Because they are so lightweight, they could even hang onto the Metal & Cable Corporation multi-magnet roof mount.

The Yaesu ATAS-100 motorized whip is another solid performer, and it auto-tunes itself with the Yaesu FT-100 or FT-847. It may also work on many other transceivers using some

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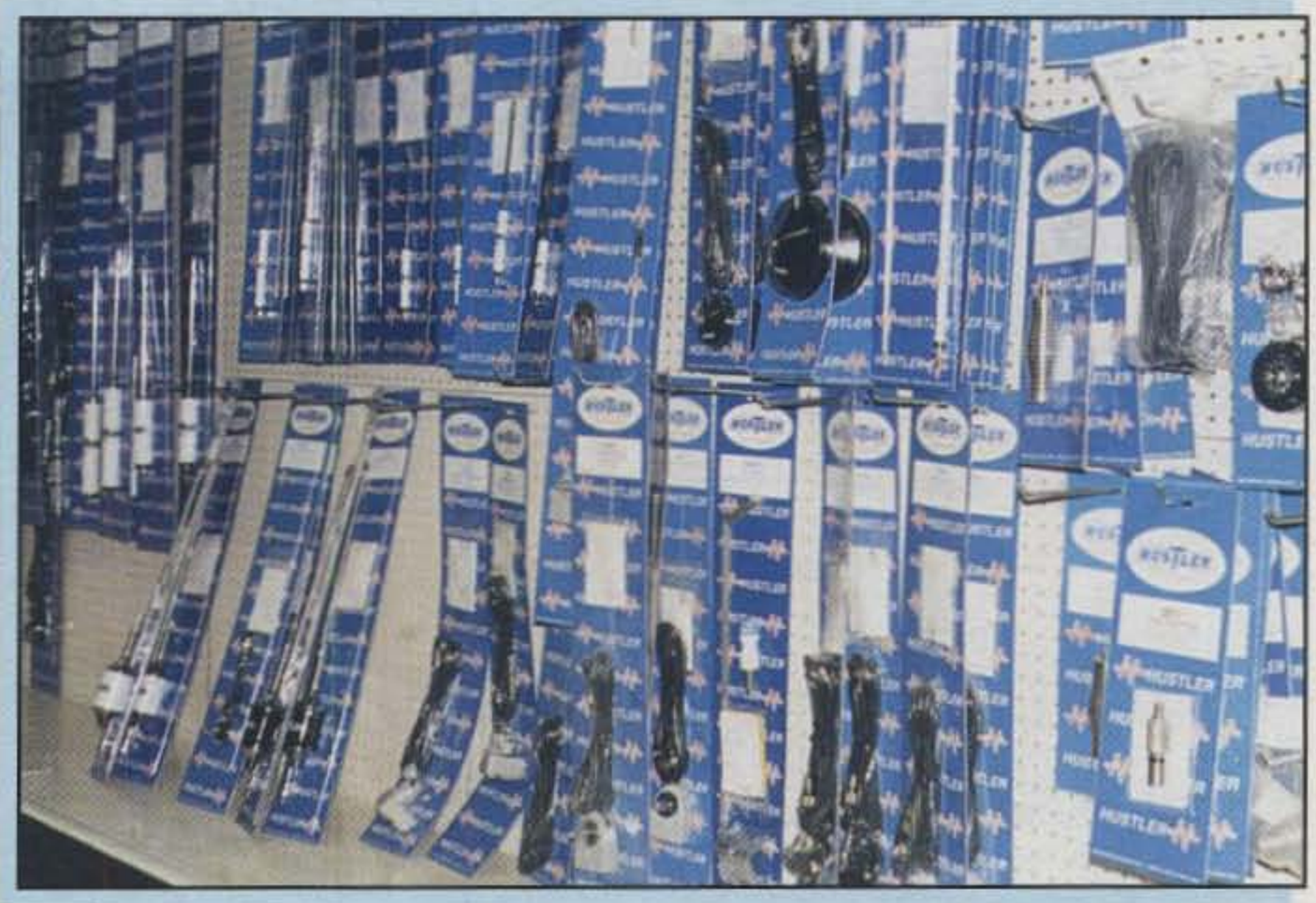

Some of the choices available in the "big antenna" category.

Center-loaded Hustler antennas, with different attachments for different bands, have long been among mobile operators' favorites.

rather clever, inexpensive after-market motor-driver tuners where you watch the SWR and stop the tuning process manually when you hit resonance. For the last couple of years I have operated the ATAS-100 up on the ice in Alaska, and it works like a champ! Best of all, it's relatively lightweight and packs nicely in a suitcase with the stainless-steel whip flexed around its body. Because the Yaesu whip is so lightweight, it allows you to mount it up high, and this may dramatically improve your radiated HF signal. The antenna also terminates to common SO-239 threaded connectors.

Traditional 6–7 Footers

These are often referred to collectively by hams as "Ham Sticks," even though that is a registered trademark of Lakeview, Inc., and despite the fact that each manufacturer has created its own name for these hard-working, single-band, center-loaded, fiberglass-shaft and stainless-steel stinger performers *(kind of like the problem Xerox has with people referring to any photocopier as one of theirs—ed.)*. These relatively similar fiberglass and stainless-steel, center-loaded whips are nearly indestructible, and if you actually wipe out one, they can be replaced at about $22 apiece. (If you wipe out a Comet or Yaesu, you're into several hundred dollars!)

They are available from Alinco Iron Horse, Anttron, Lakeview, MFJ, Ten-Tec, Valor, and Wintenna. The design is classic, but make sure there are at least two Allen screws securing the top stainless-steel whip in place on the fiberglass shaft. Also make sure you seal the joint between the stainless-steel whip and the fiberglass shaft. (Coax Seal® is a great product for this.) What occurs in wet weather is that moisture will drip down the stainless-steel shaft, collect inside

Some of the smaller antennas, such as this one from Antenna World (and others from SGC and Outbacker), break down into pieces small enough to carry in a suitcase for operating from rental cars.

a hollow fiberglass coil form, and completely detune the antenna system until the water gets poured out. Some of the manufacturers are going to solid shafts, and while this adds weight, it precludes the "rain gauge" problem.

There are also lots of no-name imitations, some even coming in fiberglass-shaft colors to match your vehicle. If you buy the whips as a complete set, one per band, they may also include some small, high-voltage disk capacitors in order to improve feedpoint matching on 40 and 75 meters. There is no easy way you are going to attach these capacitors, so go with the antenna on its own and see what the match is like at the transceiver.

The Alpha Delta Outbacker is an absolutely unique multi-band (one band at a time) antenna. You change bands by plugging into different tap points along the heavy-duty fiberglass shaft. Outbacker manufactures several different varieties of the antenna—some with a short shaft and a long stainless-steel stinger, yet others with a longer shaft and a short stainless-steel stinger. One trick that Dave Ingram, K4TWJ, uses is plugging into the 15 meter tap point, replacing the short stinger with a yard-long stainless-steel stinger, and then operating more efficiently on 20 meters. He tells you how to do this in his operating high-frequency book.

Another style that gives terrific performance in a 6–7 foot single-band system is the tried-and-proven, age-old Hustler coils and extender shaft. You can't argue with success. They are rugged, dependable, and offer either 400 watt or 1 kilowatt coils. Not that you're going to run 1000 watts, but the kilowatt coils may sometimes double the amount of frequency coverage you have down on the lower bands. Hustler is a fine name for center-loaded coil whips.

A lesser-known antenna these days is the helical, top-loaded whip from (Anixter) Mobile Mark. There is no stainless-steel stinger at the top, and tuning is accomplished by very carefully removing a few turns at the tip end of the top-loaded coil to raise the resonant frequency. Be very careful to bury the tip end of the tuned wire so it is only touching fiberglass, *not* the red protective cap. If you allow that freshly cut, top-loaded wire to touch the red rubber cap, you will see quite a light show, and your transceiver will go nuts trying to figure out what in the world is sparking at the opposite end of the antenna circuit! However, the classic Mobile Mark whips indeed have their place in the 3/8" × 24 antenna line-up because they will often drop into resonance more easily than a center-loaded whip if the antenna is mounted relatively low on a vehicle, such as on the rear bumper. Center-loaded whips like nice high mounting for minimum SWR. (More on mounting locations later.)

WARNING: *You could be killed if your extended mobile antenna whip comes in contact with power lines.* I strongly recommend that any tall mobile whip over an adjustable coil be a fiberglass variety, as opposed to steel.

Taller Heavyweights

When an antenna manufacturer provides a larger loading coil, ideally at least one third of the way up from the base of the mobile antenna mast, there will be a decrease in coil resistance and an increase in radiation efficiency. Keep in mind that any loaded mobile antenna is at a minus dB point over unity gain from a natural unloaded, one-quarter wavelength whip. For 40 meters your choice is driving around with a 32 foot whip, or going with a loaded whip where coil winding losses are kept at a minimum.

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for resonance between 10 and 75 meters.[2] The Hi-Q antennas indeed terminate to a 3/8" × 24 thread mount, but you'd better have one heck of a solid mount to keep the antenna in place at driving speeds. On our communications van we use 100 pound monofilament fishing line to keep the antenna in place at highway speeds. We also have a big selection of top whips, depending on whether we're operating while stopped or in motion.

The Hi-Q antenna reminds me of my old Swantenna, along with my old adjustable Webster Band Spanner. Both antennas feature an internal loading coil with an adjustment to move a tap point up and down inside the coil, achieving resonance. On the old Swantenna, resonant points would click in. On the old Webster blue Band Spanner, you would simply pull the whip in and out until you found the right spot.

Yet another way of getting a great signal on the airwaves is the SGC dual-loaded whips that terminate into the 3/8" × 24 threaded mount on the SGC automatic antenna coupler. Inside the base tuner, such as the SGC-QMS 37, are thousands of combinations of L (inductance) and C (capacitance) that click in as soon as you begin to talk over your transceiver. The smart automatic coupler takes less than a second to get maximum antenna current into the proprietary dual-loaded, helically wound whips. The system works well!

SGC's "QMS," or Quick Mount System, allows you to hook up an HF antenna on your car without drilling holes. It also has a built-in automatic tuner.

Which One Works Best?

When it comes time to pick a whip that may work best for your particular type of vehicle or motorhome, I have found that none of these antennas will work in every possible installation location. Therefore, don't let anyone tell you that one antenna will be best for every vehicle. This is not so!

If you have a massive-size van or motorhome, certainly consider one of the heavy-duty, tall antennas, making sure not to exceed 13 1/2 feet. You may wish to go motorized if the antenna is mounted so high that you can't easily reach it.

If you regularly run HF mobile from a rent-a-car, you will need to select whips that can be separated and will fit inside your suitcase. Alpha Delta Outbackers may even be ordered as a triple split, small enough to fit in carry-on luggage.

If you plan to mount your antennas with one of the popular lip-mount assemblies from Diamond, Comet, or MFJ, the lightweight fiberglass shaft with stainless-steel stinger "Ham Whip" will probably hang on quite nicely. You can even run these lightweight whips on triple or quad magnet mounts available directly from the manufacturer, Metal & Cable Corporation. It takes a minimum of three magnets to hold an HF whip on most vehicles. Don't even try it with a single mag mount!

Even better advice would be to first locate a spot on your vehicle that can accept a relatively high mounted lip mount. For a pickup truck, stake mounts work nicely. Get the mounts in place and attach the whip receiver with its 3/8" × 24 threads and coax assembly. Now bring out your trusty MFJ SWR analyzer and take a drive to a local ham store or visit a pal who may have a whole bunch of high-frequency whips hanging around. Methodically try each one on your mount and see which one gives you a nice dip in SWR. You will find that your particular installation may favor one specific brand of whip over others. This has a lot to do with how they make the shaft, or whether the whip contains an impedance matching device within the base. I have found each whip from each manufacturer slightly different in how they load up on a vehicle, and through experimentation you'll end up with the right match.

Now double check that the whip you have selected is not going to overload your mount. Is it up as high on the vehicle as you can get it? Have you checked that you are not exceeding maximum highway height limitations? Is it mounted on the left side of your vehicle to avoid tree branches?

The performance of your installation will be split between total whip length and where the whip is mounted. I have seen extremely long high-frequency whips mounted very low not perform as well as a much shorter high-frequency whip

mounted up high. I have also witnessed massive screwdriver-type whips not performing as well as a little tiny "Ham Stick" because there was a relatively high VSWR at the feedpoint, and most solid-state transceivers for mobile use don't have built-in antenna tuners and immediately fold back power when the SWR gets above 1.5:1.

There's no single, magic high-frequency whip that is going to work best for every installation. That includes the massive monster whips you would think would be the ultimate; when mounted properly they may be, but if mounted too low without the right impedance matching networks at the base, they don't perform as well as a lightweight fiberglass-shaft short whip. Surprise, surprise!

So have fun on high frequency, and if you're choosing one of those several hundred dollar high-frequency whips, just be sure to unscrew it and bring it in at night so it doesn't walk away on you.

Footnotes

1. See "CQ Market Survey: HF Transceivers" in the March, 2001 issue of *CQ* for a look at the radio choices.

2. See review of the Hi-Q antenna in the July 2001 issue of *CQ*.

Resources

For more information on the antennas discussed in this article, please contact the following manufacturers or your favorite amateur radio dealer:

Alinco Iron Horse: Atoc Distributing LLC, 23 S. High St., Covington, OH 45318 (937-473-2840).

Anttron: Anttron Antenna Company, P.O. Box 2744, Youngstown, OH 44507-0744 (phone 330-788-9404; fax 330-788-7709; order line 1-800-837-5516; e-mail:<anttron@juno.com>; web: <http://anttron.tripod.com>).

Alpha Delta (Outbacker): P.O. Box 620, Manchester KY 40962 (phone 606-598-2029; fax 606-598-4413; toll-free order line: 888-302-8777; e-mail: <sales@alphadeltacom.com>; web: <http://www.alphadeltacom.com>).

Antenna World: e-mail: <Tom@antennaworld.com>; web: <http://www.antennaworld.com>.

Diamond: RF Parts Co., 435 S. Pacific St., San Marcos, CA 92069 (orders 800-737-2787; phone 760-744-0900; fax: 760-744-1943; e-mail: <rfp@rfparts.com>; web: <http://www.rfparts. com/diamond>).

Hi-Q Antennas: 21085 Cielo Vista Way, Wildomar, CA 92595 (phone 909-674-4862; fax: 909- 245-2031; e-mail: <hiqantennas@aol.com>; web: <http:// www.hiqantennas.com>).

Hustler: e-mail: <hustler@txol.com>; web: <http://www.new-tronics.com/>.

Lakeview Co.(Hamsticks): 3620-9A Whitehall Rd., Anderson, SC 29626 (phone 864- 226-6990; fax 864-225-4565; web: <http://www.hamstick.com>).

Metal & Cable Corp.: 9337 Ravenna Road, Unit C, P.O. Box 117, Twinsburg, OH 44087 (phone 330-425-8455; fax 330-963-7246, e-mail: <David@metal-cable.com>; web: <http://www.metal-cable.com>).

MFJ Enterprises:- P.O. Box 494, Mississippi State, MS 39762 (phone 800-647-1800 / 662- 323-5869; fax 662-323-6551; e-mail: <mfj@mfjenterprises.com>; web: <http://www.mfjenterprises.com>).

NCG/Comet: 1275 North Grove Street, Anaheim, CA 92806 (phone 714- 630-4541; fax 714-630-7024; e-mail: <micks@cometantenna.com>; web: <http://www.cometantenna.com>).

SGC, Inc.: 13737 SE 26th St., Bellevue, WA 98005 (phone 800-259-7331 / 425-746-6310; fax 425-746-6384; e-mail: <sgc@sgcworld.com>).

Ten-Tec: 1185 Dolly Parton Pkwy., Sevierville, TN 37862 (phone 800-833-7373/865-453-7172; fax 865-428-4483; e-mail: <sales@tentec.com>; web: <http://www.tentec.com>).

Valor: CTI Audio, Inc., 341 Harbor Street, Conneaut, OH 44030 (phone 440-593-1111; fax 440-593-5395; e-mail: <sales@ctiaudio.com>; web <http://www.valorantenna.com/>).

Yaesu: Vertex Standard, 17210 Edwards Rd., Cerritos, CA 90703 (phone 562-404-2700; fax 562-404-4828; e-mail: <amateursales@vxstdusa.com>; web: <http://www.yaesu.com>).

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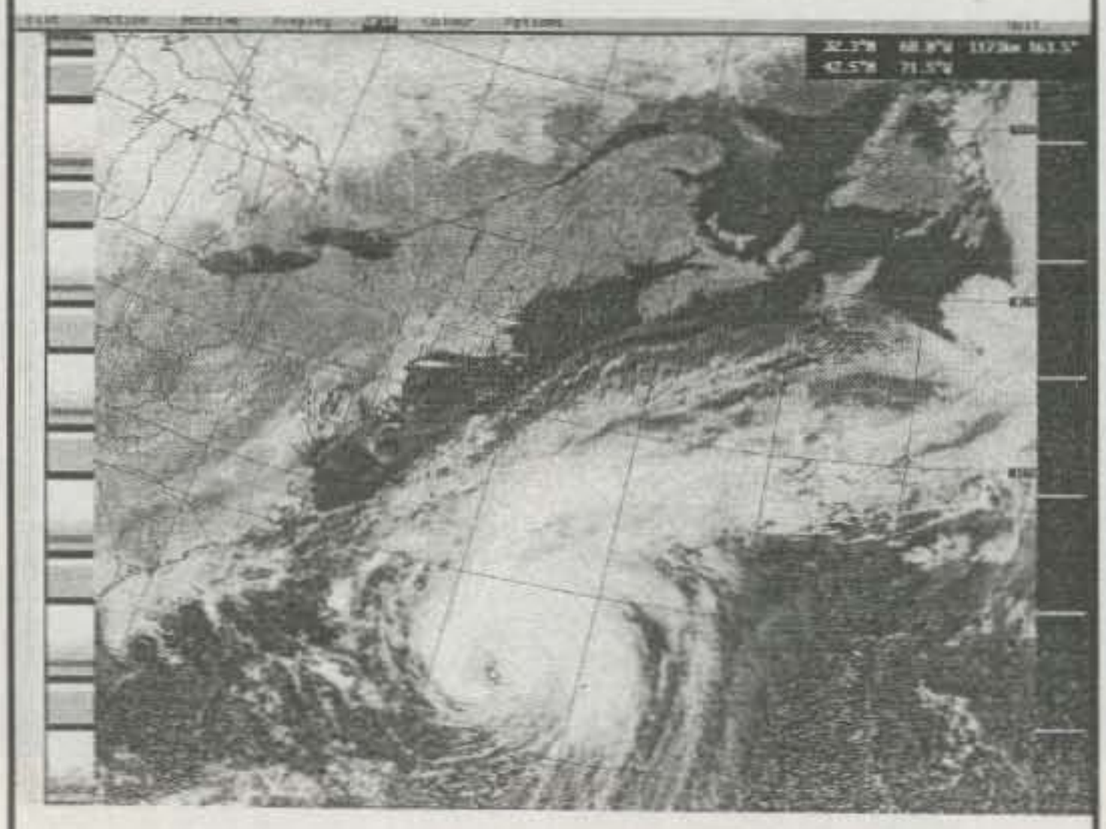

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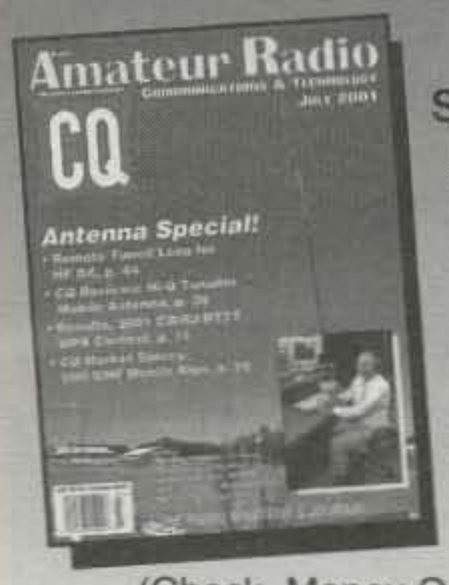

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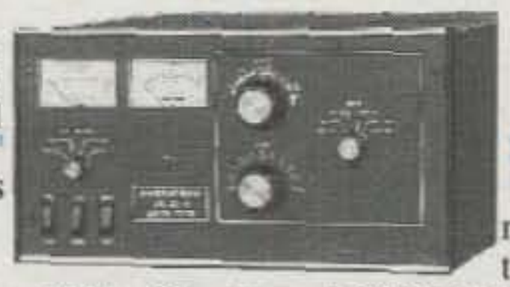

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"I just don't get it. ... This antenna seemed to work much better on my old car than on my new one." Read what K6MHE discovered with the help of antenna-modeling software and you'll begin to understand.

VHF Mobile Antenna Performance

The other half of the story

BY DAN RICHARDSON,* K6MHE

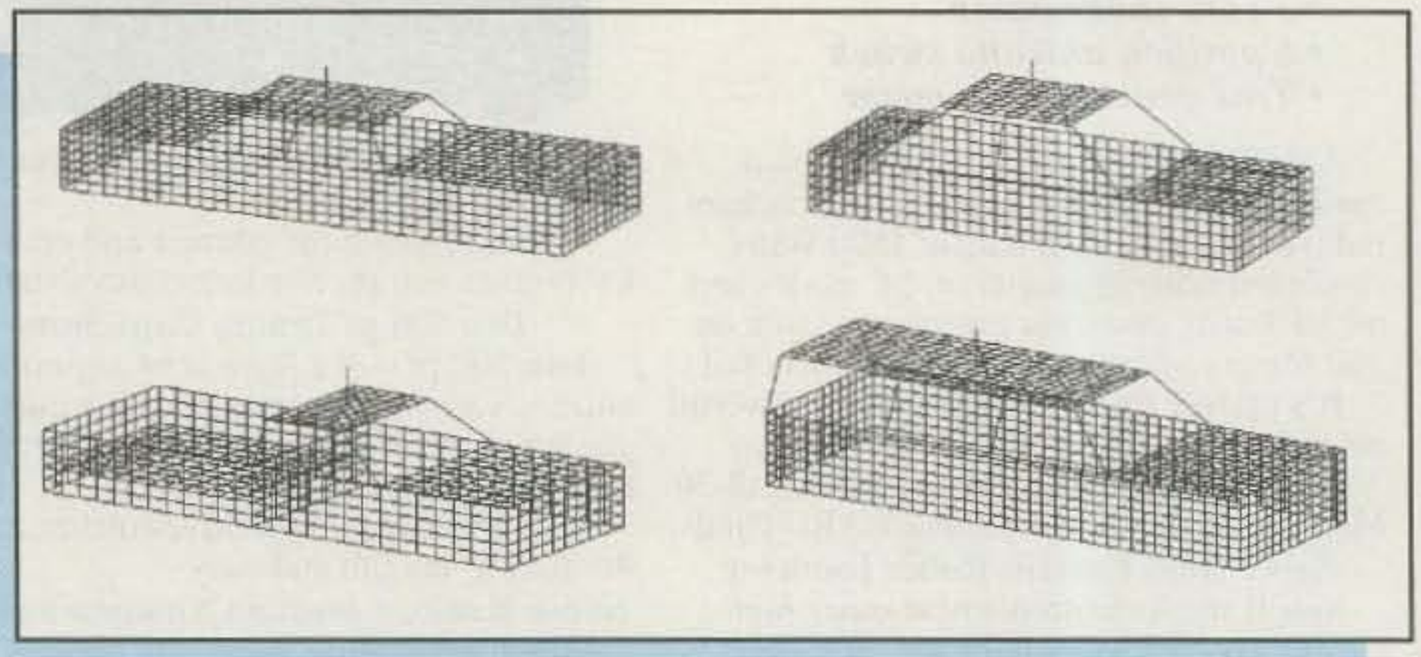

Fig. 1– Wire-grid vehicle structures used in the NEC analysis described in the text.

Did you know that the size of your car can and does have a profound effect on how your antenna performs? You might be surprised at the variations of an antenna's pattern and gain, depending on whether it is installed on a full-size or mid-size passenger car, let alone a pickup truck or sport utility vehicle (SUV).

I had been trying to resolve for myself the many claims and counterclaims regarding the 3 dB gain attributed to the 5/8-wavelength monopole when used in VHF mobile applications. In that pursuit and using computer modeling, I soon discovered that the type of vehicle made a noticeable—sometimes profound—difference in performance.

Antenna Modeling

Antenna-modeling software has provided an excellent tool for predicting antenna performance. However, until recently, modeling mobile antenna systems has been a major pain. Calculating and entering all the geometric data—without errors—for a wire-grid model of vehicles such as the ones shown in fig. 1 can take many hours of tedious work. Fortunately, with the recent availability of *NEC Win-Synth*[1], a software tool that makes creating wire grid models of vehicles (and other structures) a snap, that problem has been eliminated.

Using *NEC Win-Synth* to create the vehicle models and *NEC2,* I analyzed three of the most widely used VHF mobile antennas (1/4-, 1/2-, and 5/8-wavelength monopoles) each installed on four different vehicles (a full-size and mid-size passenger car, a small pickup truck, and an SUV).

The models themselves (fig. 1) are rather boxy, reminiscent of the Volvos of years past, and do not truly portray the sloped-front, high-back cars they are making now. They do, however, provide a reasonable approximation of the overall dimensions, and I felt they would be sufficient for making the antenna comparisons.

All modeling was done at a frequency of 146 MHz utilizing average ground parameters (conductivity 0.005 s/m, relative permittivity 13). The antennas were located at top dead center of each vehicle's roof.

Variations

I had anticipated that there would be some irregularities in radiation patterns among *dissimilar* vehicles, but I truly didn't expect them to be so great among *similar* vehicles such as full-size and mid-size passenger cars! The full-size and mid-size car models are fairly comparable in shape. The dimensions of roof sections are within a couple of inches of one another, the main difference being the overall length, where there is a 12–13% variance.

NEC comparison plots for the cars with each of the three antennas are illustrated in fig. 2. The front of each vehicle is oriented at 0º azimuth for all plots. To better illustrate differences, each plot has been normalized. Consequently, the dB reference value for the outer ring (0 dB) varies from plot to plot and is not given. We'll discuss gain a little later.

Examining these patterns (fig. 2), we can find only a few consistent traits among the cars. One notable pattern is that the greatest variations occur using the 1/4-wave whip and least variations occur with the 5/8-wave whip. Another apparent characteristic is that the maximum variances exist in a plane that follows the vehicle's length. From this we can see that the car's body plays a significant role in the antenna's perfor-

*P.O. Box 2644, Fort Bragg, CA 95437
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[1] *NEC Win-Synth, Nittany Scientific, Inc., 1733 W 12600 S, Suite 420, Riverton, UT 84065 (www.nittany-scientific.com)*

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MODEL SRM-30

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SRM-30	25	30	3½ x 19 x 9⅝	7.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M	20	25	3½ x 19 x 9⅜	6.5
SRM-30M	25	30	3½ x 19 x 9⅜	7.0

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SRM-25-2	20	25	3½ x 19 x 9⅜	10.5
SRM-30-2	25	30	3½ x 19 x 9⅜	11.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M-2	20	25	3½ x 19 x 9⅜	10.5
SRM-30M-2	25	30	3½ x 19 x 9⅜	11.0

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SS-10SM/GTX, SS-12SM/GTX, SS-18SM/GTX
SS-10RA
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*ICS – Intermittent Communication Service

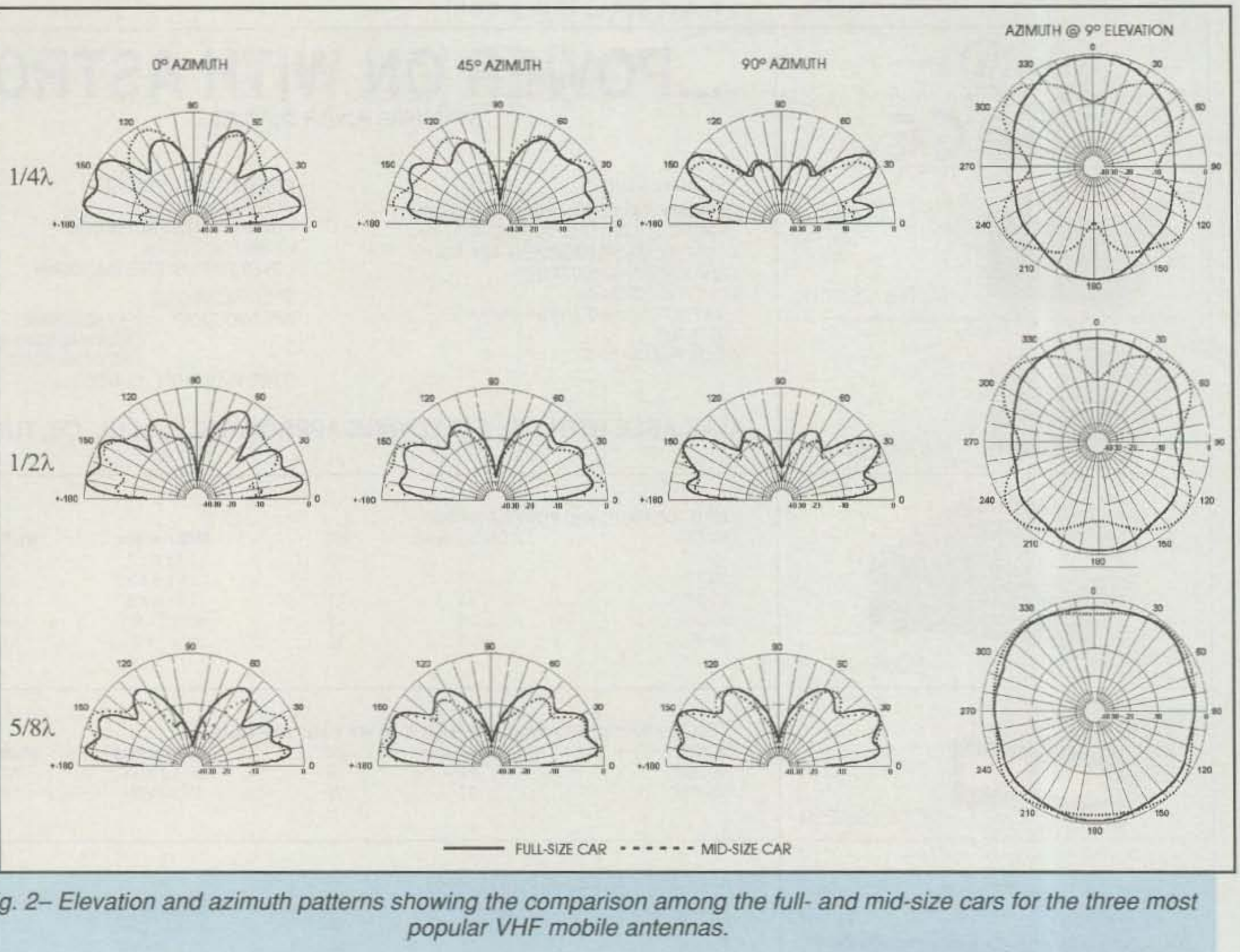

Fig. 2– Elevation and azimuth patterns showing the comparison among the full- and mid-size cars for the three most popular VHF mobile antennas.

mance. Why so much variation in similar vehicles?

Monopoles/Ground-Planes

In order to work, an end-fed monopole must have something to work *against*. In ground-mounted HF systems, this is the ground on which they are mounted. If they are elevated, as are most VHF installations, some form of counterpoise (usually a ground plane consisting of several 1/4- or 1/2-wavelength radials) is used. A properly built ground-plane does not radiate; only the monopole portion of the antenna system does, producing an omni-directional azimuth pattern. For VHF mobile installations there is a misconception that a vehicle's roof serves as the ground-plane and doesn't radiate, and that therefore the antenna radiates in the same fashion as a conventional ground-plane. This is not true and I will now explain why.

It's Not A Monopole

Although the car's roof section does provide an area for a monopole to work against, there are some important details we need to look at. First, the roof is rectangular in shape and does not have the even, disk-like form of a radial system used on a conventional ground-plane. This in itself will cause some skewing of the azimuth pattern. However, a more significant point is that the RF energy is not confined to just the roof area. There is nothing preventing it from flowing down the supporting columns to the doors, fenders, hood, and trunk lid. (This can easily be confirmed by examining the segment currents within the models reported by *NEC*.) The result is that the whole vehicle is radiating and is actually one half of a dipole antenna system, the other half being the roof-mounted vertical element. Granted, this is geometrically and electrically a very lopsided dipole, but a dipole nonetheless. We know that changing the size and/or shape of one arm (half) of a dipole will certainly affect its pattern and gain. This is why we have the substantial differences between the antenna patterns for two cars even though their roof dimensions are nearly identical.

Okay, now that we have a better picture of what's happening, let's move on and take a look at the rest of our vehicle-dipole combinations.

The Results

To save you the drudgery of examining a multitude of antenna plots requiring many pages of magazine space, let me give you a summary of a couple of items that were similar in a majority of the models.

Generally (about 80% or more of the time; there were exceptions) the 1/4-wave whip had the highest high-angle radiation component. Elevation plots for the 1/4-wave revealed that most of the energy was being launched between 7º and 80º. The 1/2-wave antenna's was slightly lower (between 7º and 70º), with the 5/8-wave the lowest (between 7º and 60º).

In all of the elevation plots the lowest significant lobe was about 9º. In most cases it was not the most significant lobe in amplitude. However, it is the most significant for long-range towards the horizon communications. For that reason I chose a 9º elevation angle for

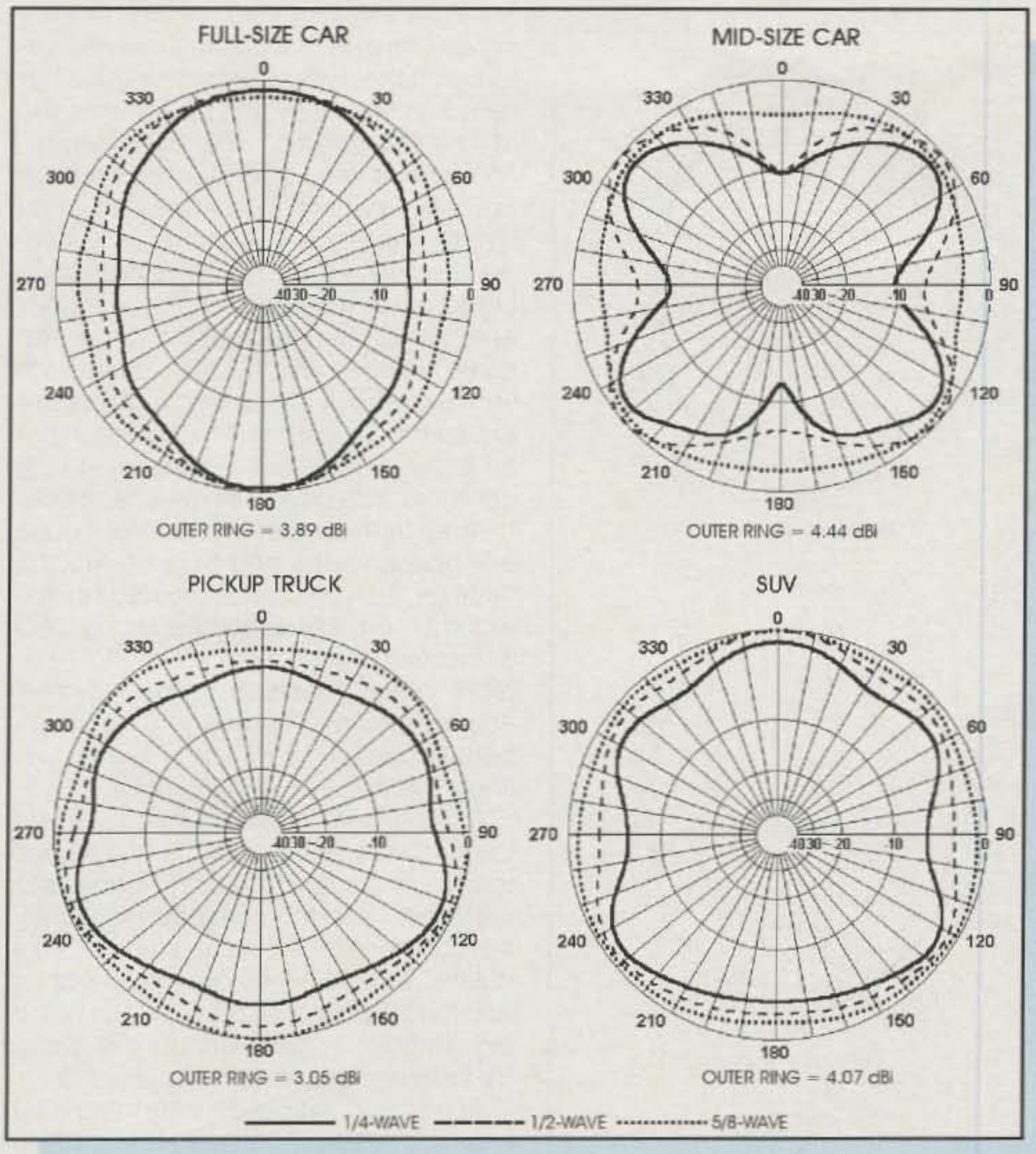

Fig. 3– Azimuth pattern variations (9º elevation) resulting with the different-length antenna elements.

creating a series of azimuth antenna-pattern comparisons.

I made two groups of azimuth plots. The first (fig. 3) displays the variations resulting when the different-length antenna elements are placed on the same vehicle. The second (fig. 4) displays how the different vehicles compare with one another when using the same-length antenna element. For the best display all plots are normalized. However, the outer ring's dBi value is shown for each plot.

I found it a real eye opener to see the amount of variation among the models. A noteworthy exception was that the 5/8-wavelength element consistently produced the best omni-directional pattern. An additional expanded linear plot for the 5/8-wave vehicle combinations is shown in fig. 5 and provides a better view.

Gain

To the extent that the 5/8-wave produces more gain, well, that's another matter. Note that in fig. 5 the pattern for the 5/8-wave/SUV combination has an azimuth pattern that varies as much as 1 1/2 dB. Adding to that, you can also see that depending upon the vehicle selected and what azimuth bearing is compared, it is possible for a 5/8-wave to have 2 1/2 dB gain over itself. You might also consider that the maximum gain figures shown for *all* the antenna and vehicle combinations, in figs. 3 and 4, varied less than 1 1/2 dB. Therefore, in the gain game it's your call.

Let's be realistic about gain. If you have ever operated mobile, you know it is not at all unusual to observe a signal rapidly fluctuating 20 dB or more while you are driving. Under those conditions, you really aren't going to distinguish any gains under 3 dB one way or the other. Possibly under marginal conditions with the vehicle at rest a 1 or 2 dB improvement may make a difference, but it is highly doubtful that in normal mobile operation such a small gain increase would be discernible.

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On the Cover

Putting a rig in your car or truck isn't the only way to operate mobile. Elsewhere in this issue, Jeff Francis, NØGQ, tells us about operating pedestrian mobile, and on our cover, Jonathan Link, K4III, of Sarasota, Florida, adds bicycle mobiling to the equation.

Jonathan was a cyclist before he became a ham about three years ago, and when he got his license, it just seemed natural to outfit his bike with a ham station. His setup is pretty basic — a RadioShack HTX-202 on low power (about 1–2 watts) to a Hustler CGG-144 2 meter collinear mounted behind his seat. Jeff says his body blocked the signals from smaller antennas when he got between the antenna and the person he was working, but the 7-foot-long collinear puts enough signal up over his head to give him 360-degree coverage while riding. The antenna is attached to a truck mirror mount, which in turn is attached to a horizontal section of the rear frame of Jonathan's 21-speed Huffy.

A recent graduate of the University of South Florida, Jonathan works in computers and web-page design. His primary ham radio interest is public service and emergency communications. He is a member of ARES and RACES and is a certified SKYWARN weather spotter. He says having the rig on his bike may come in very handy in the aftermath of a hurricane for getting into areas that are impassible to larger vehicles. Jonathan has also recently purchased a 440 MHz repeater, with which he hopes to encourage more activity on that band.

"I've always enjoyed bicycling," notes 24-year-old K4III. "Ham radio adds to it... (it) makes riding all the more worthwhile."

(Cover photo by Larry Mulvehill, WB2ZPI)

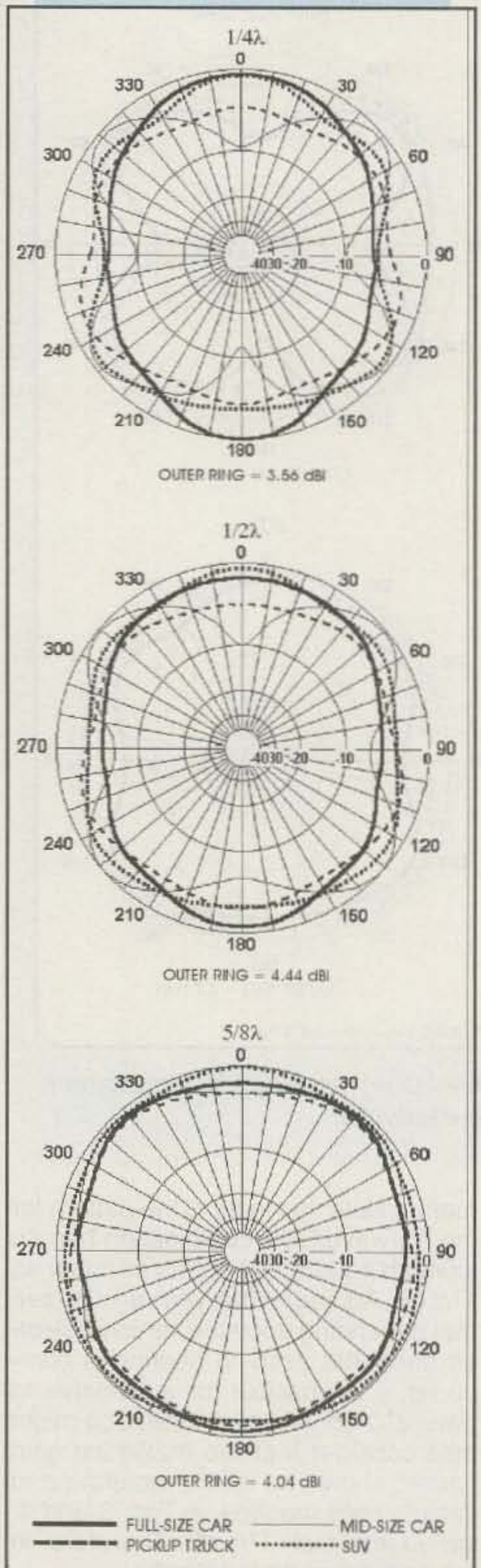

Fig. 4– Azimuth patterns (9º elevation) displaying how the vehicles compare using the same-length antenna element.

Conclusion

As I stated at the onset, I had originally planned to investigate the gain of a 5/8-wave monopole as used in VHF mobile operation. What I gleaned was that the 5/8-wave element was, in fact, operating as one arm of a dipole antenna system with the vehicle providing the other half. Subsequently, the size and shape of a vehicle has a substantial influence, sometimes very pronounced, on the radiation pattern regardless of what length antenna element is used. Additionally, I found that it is not possible to accurately predict how a mobile antenna system will perform based on some other mobile system, unless the vehicles and antenna installations are the same. To get any kind of meaningful estimation would require modeling each situation on a case-by-case basis.

Keep in mind that the models I used are *approximate,* and thus so are the findings. To have better accuracy would require more exact models. Using CAD software to create wire-grid models that more closely conform to the vehicles' actual form and size would generate better results. *NEC Win-Synth* will import *AutoCad*® (*.dxf files).

Another item I did not address here is the fact that some portions of vehicles today are constructed using composite materials. Therefore, the surfaces may be more reflective than conductive. This makes it highly problematic to obtain accurate results with *NEC,* as one of the big cautions in *NEC* literature is not to try to model diffraction edges.

At this point, about the only thing I feel I can say with any certainty is that using a 5/8-wave antenna *should* produce a better omni-directional pattern. Other than that, all bets are off! ■

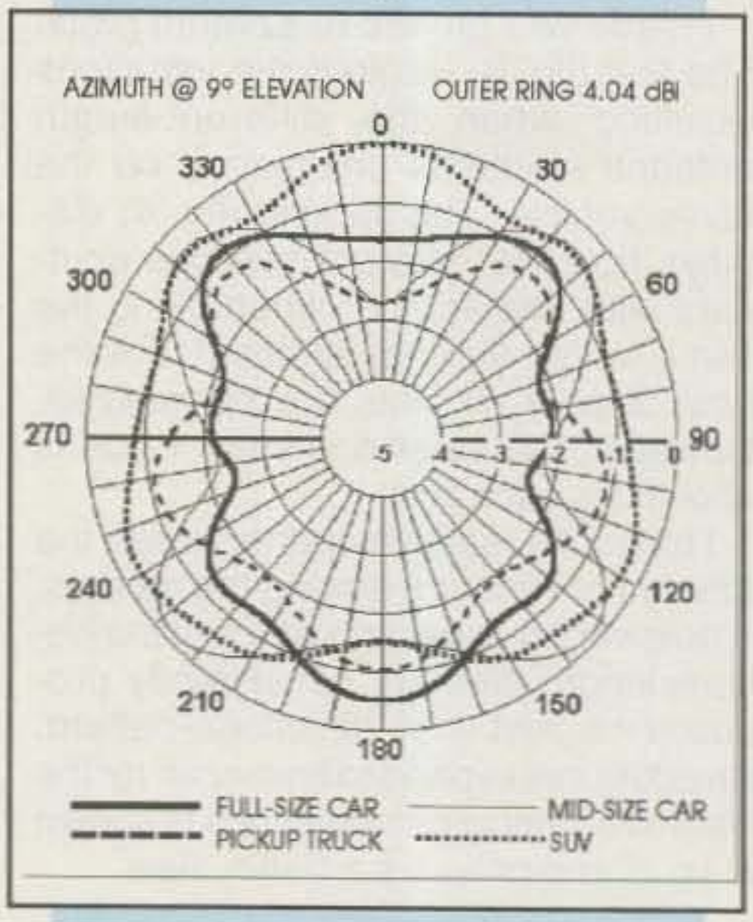

Fig. 5– Expanded linear azimuth pattern for the 5/8-wave antenna mounted on the four vehicles.

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How do you install that new rig under the dashboard in a car that doesn't seem to have an "under the dashboard"?

Console Mounting For Detachable-Head Radios

BY ROBERT J. DOOLITTLE,* W1CTC

If you've ever tried to install a ham rig in a modern car or truck, you know it can be very difficult. Most of the dashboard is taken up with various options and controls, and there doesn't seem to be any "under the dashboard" anymore. I found myself in just such a predicament when I replaced my spacious, but aging Blazer with a 1998 Jeep Grand Cherokee. There was no room on the dash or the console for my rather small 2 meter FM rig. Even the underseat space was not usable. A search of the internet still did not give me any ideas except for the stalk-type mounting system that I didn't care for.

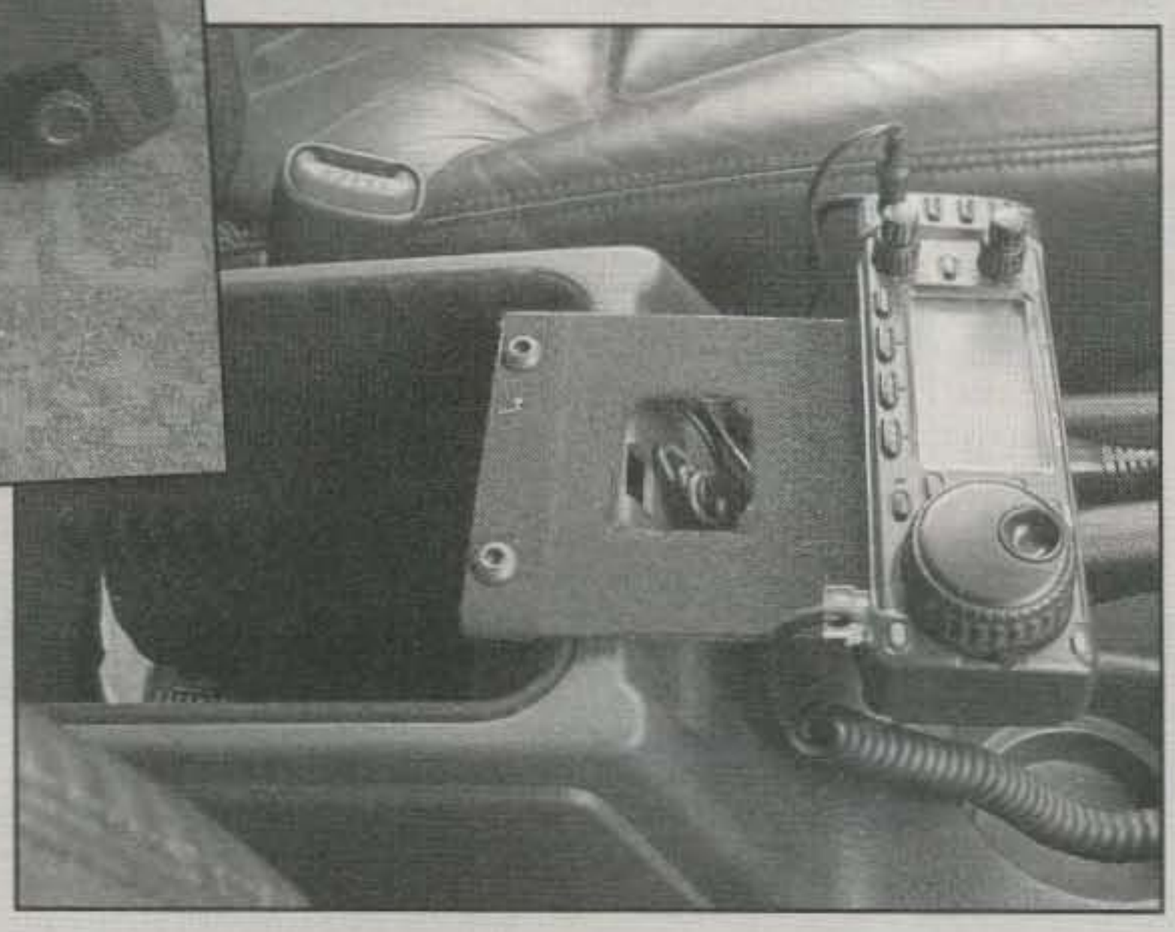
I used the handheld for a while and found it less than ideal. Things looked up when I acquired a used ICOM IC-706 transceiver with the removable faceplate. There was still no room on the dashboard, however, and I have a problem with cutting holes in my cars.

My solution was to make a small steel plate, attach the control head to it, and mount the assembly on the console. The assembly is held in place by using some hex standoffs cut to fit into the coin holders inside the console compartment. The plate is covered with a self-stick felt material to prevent damage to the plastic console parts. A square opening was cut in the plate for access to the console latch. I also mounted a small speaker below the control head. The whole assembly is easily removed by disconnecting one cable. None of the vehicle's controls or accessories is affected either.

The next problem was mounting the radio body. I found a bit of unused space

*473 Alling Farm Rd., Orange, CT 06477
e-mail: <w1ctc@hotmail.com>

The author's radio control head is attached to the homebrew steel plate before installation. ← *(Photos by the author)*



Control-head assembly mounted in vehicle's center console. See text for details of attachment and protection of console parts. →

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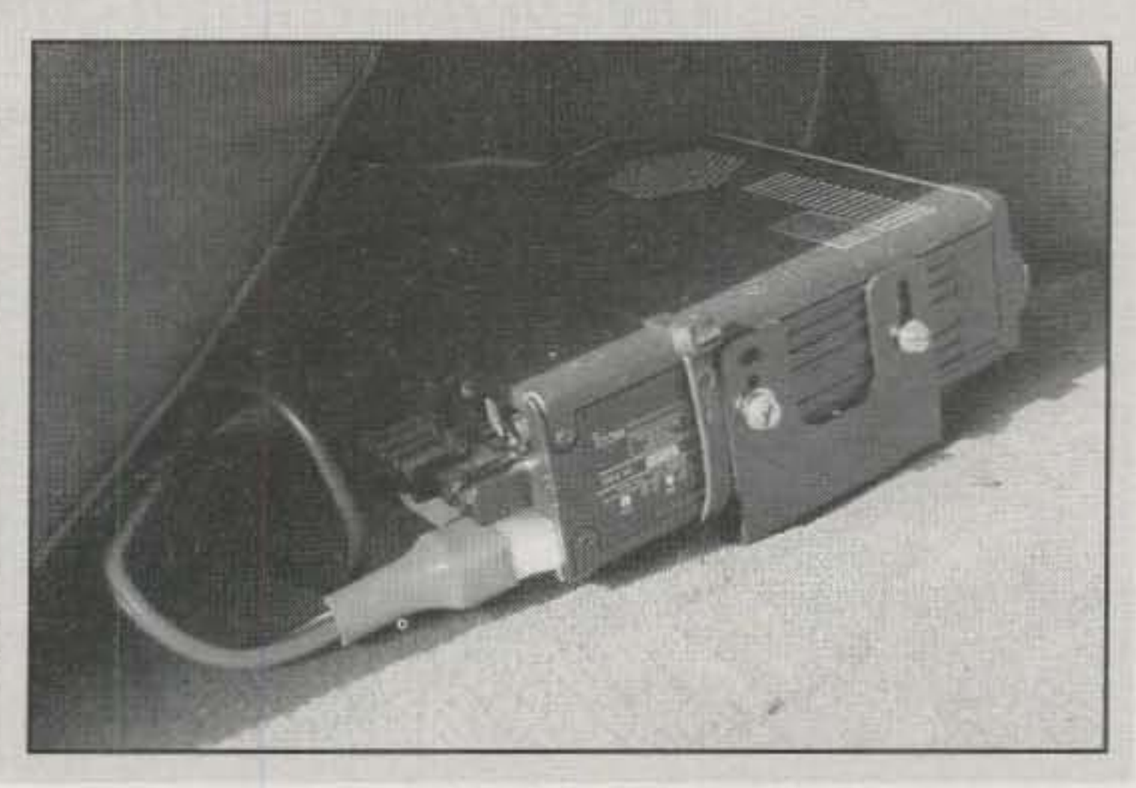
The IC-706 control head installed and ready for operation. A single cable leads to the body of the rig in the rear of the vehicle. ←



Like many radios today, the body of the IC-706 may be mounted in an out-of-the-way location, such as in the little-used spot in the cargo compartment of the author's SUV.

in front of the spare tire and a factory cargo hook in just the right place. A few large plastic ties took care of the mounting. The power cable, with proper fusing, was fed from the battery and through the firewall with the hood-release cable (it had a nice large grommet), under the door-sill molding, and to the rear cargo area.

The current antenna is a simple 2 meter whip with the coax running through the rear hatch gasket. The coax must run at the bottom of the hatch or water will follow the cable past the seal.

The next step will be the installation of HF and other modes.

I met my goals of a neat and easy-to-use installation with no permanent modifications to the vehicle. I hope this will give you some ideas about your own rolling ham station. ■

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Math's Notes

What's New And How To Use It

BY IRWIN MATH, WA2NDM

Inexpensive High-Speed Pulse Generators

With all of the experimental work now going on at higher and higher frequencies (not to mention gigabit data rates), it occurred to us that there is really no inexpensive way for the amateur to generate the RF and/or nanosecond rise and fall times needed. Any really high GHz+ frequency generator seems to cost at least a dollar a MHz, which works out to be well beyond the casual experimenter's budget. As a result, we started doing some very serious thinking to see what we could come up with. Serious thinking, by the way is the best way to solve a problem when you need something but can't afford it!

You may remember the column we did "way back" about shock-exciting a microwave cavity with a common doorbell or buzzer to produce a few microwatts. Well, it worked back then and still does. Fig. 1 shows how to do this. Of course, you will need some way to measure what you produce, but borrowing (to calibrate something) is usually a whole lot easier (and less expensive) than purchasing. Also, since the technique is so unorthodox, you may actually get someone with some real knowledge interested enough to help you out further!

The reason this technique works, by the way, is because the rise and fall time of the opening and closing doorbell contact is practically instantaneous, and the harmonics of this rise and fall time cause the cavity to resonate at its natural frequency. If you are a true dyed-in-the-wool experimenter, you can even try to fabricate your own cavity from a coffee can or soup can, but that is another story. Keep in mind, however, that the accuracy and stability of this method are based on the quality (ruggedness) of the cavity used. However, considering the cost, it's hard to beat.

We can use a similar technique to produce fast rise-time pulses. Fig. 2 is a really crude pulse generator with a pulse-to-pulse stability that is not great but with a rise-time that is hard to beat, even with the latest devices. Instead of the doorbell buzzer, however, we have chosen a TTL compatible reed relay due to the fact that the contacts are enclosed and somewhat more stable. Operation is quite simple. When the contact is open, the output voltage is zero. When it closes, full output is available.

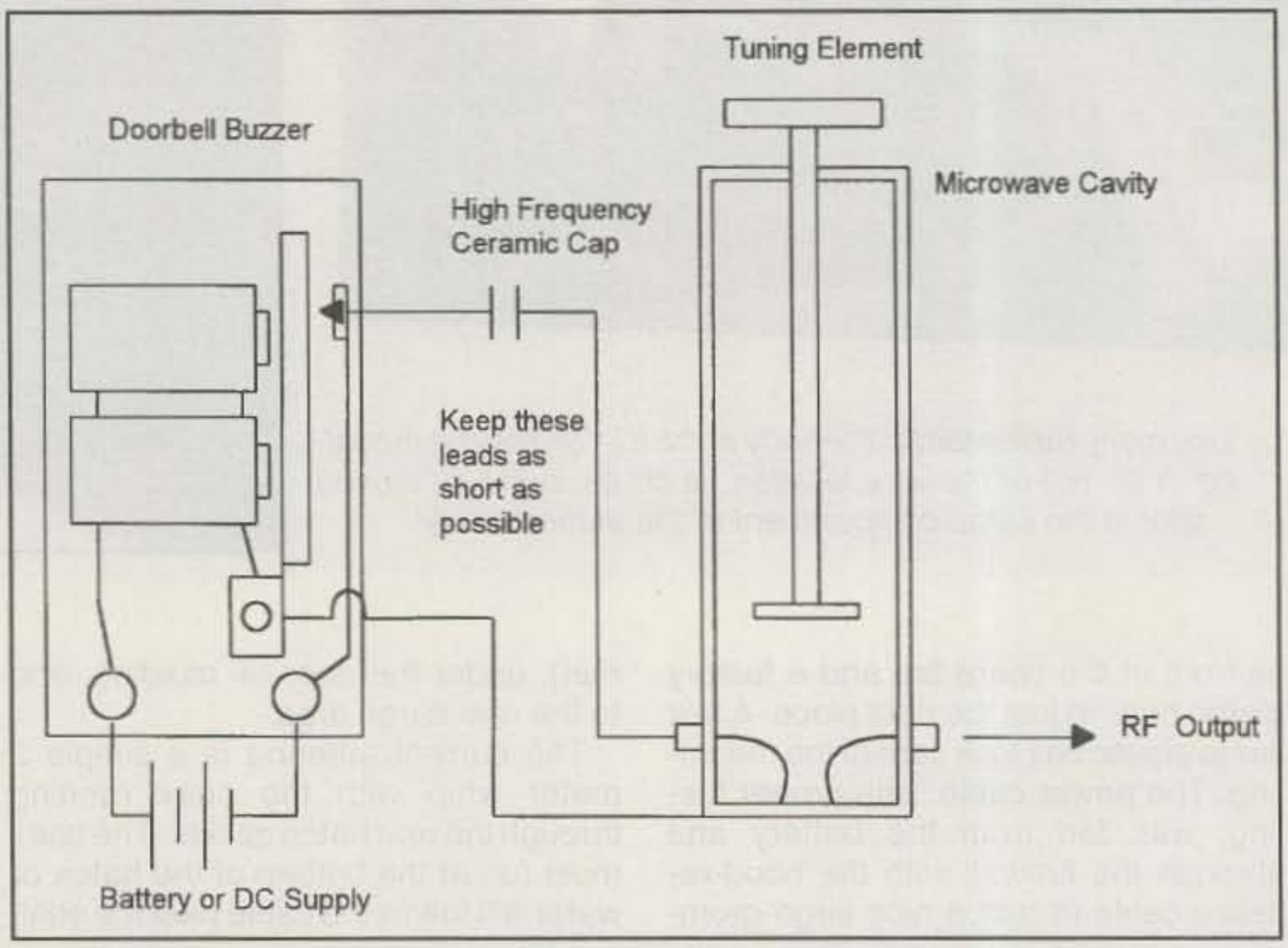

Fig. 1– An inexpensive (downright cheap!) microwave signal source.

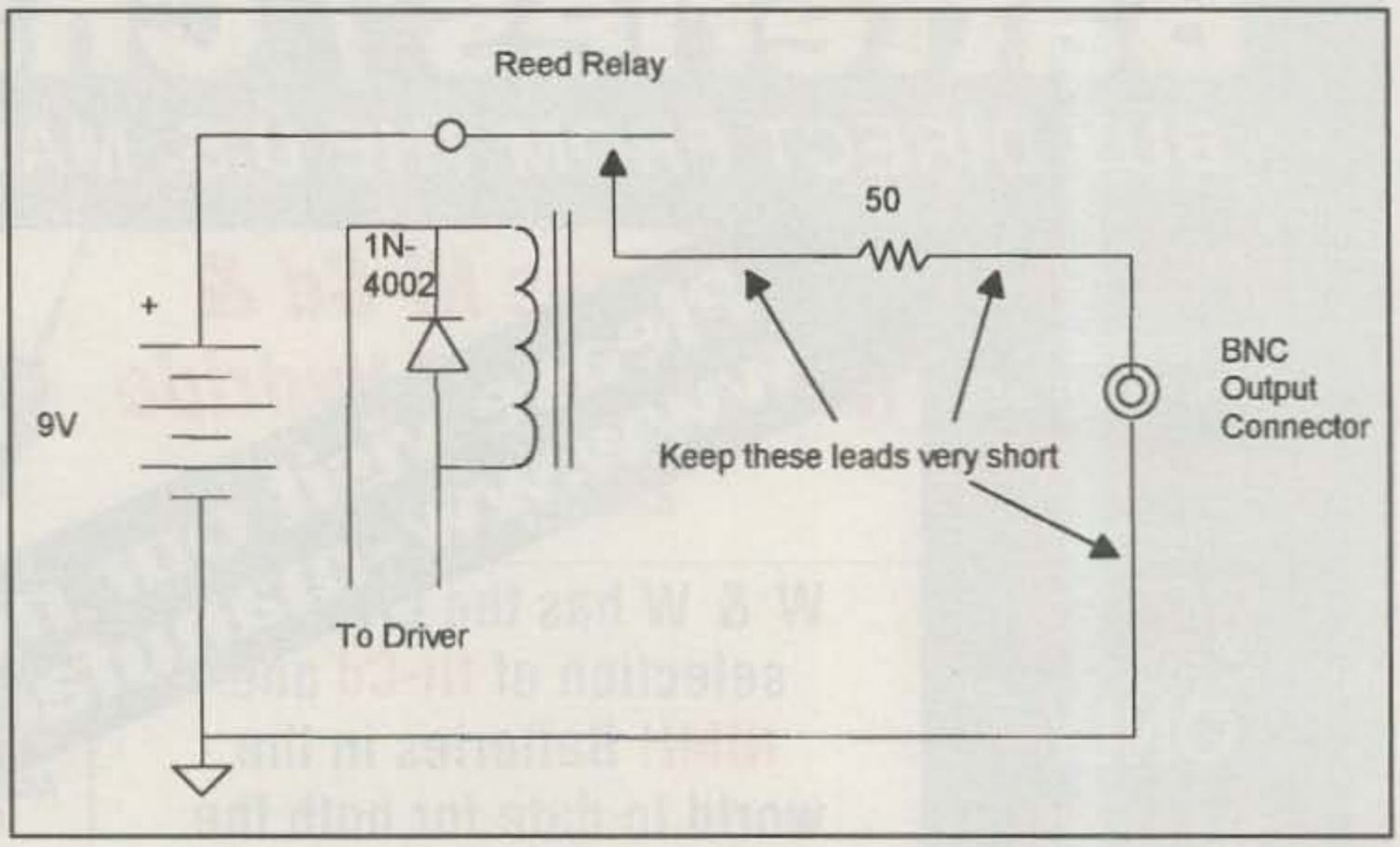

Fig. 2– Ultra-simple, fast rise-time pulse generator.

You will note that this system is designed to operate in a 50 ohm system, since the only type of interconnection for fast rise-time pulses is a 50 ohm matched transmission line. A 9 volt battery is used for power, since connecting a 50 ohm TTL load will result in half the voltage, or about 4.5 volts, which is just about right for TTL signals. Also

c/o CQ magazine

note that each time the relay closes, 90 milliamperes will flow into the load, so be sure to use a heavy-duty 9 volt battery. If portability is not important, however, a DC power supply would be an even better choice.

You may have to experiment with different reed relays to achieve the best overall response without excessive contact bounce. Conventional relays may bounce a few times, giving you multiple pulses, but if you can find a mercury whetted relay, any bounce will be less and overall operation will be better. That's what experimenting is all about. Whatever type of relay you wind up using, be sure to keep all leads as short as possible, since any stray capacitance anywhere in the relay/50ohm/BNC portion of the circuit will affect the rise-time.

A possible driver for the reed relay could be an LM 555 timer connected as shown in fig. 3. You will have to play with the values to achieve the pulse rate and width desired, but the circuit is quite simple and the values given are a good starting point. Keep in mind that the narrower the pulse, the less the average current from the power supply and the longer the battery will last. In addition, the slower the pulse rate, the longer the relay will last. For example, if the reed relay were rated for ten million operations (a typical low-end reed specification) and the pulse rate set for only 1000 pps, the relay theoretically would only last for a few hours. This is a calculated number, however, and what you actually get may be quite different.

The circuit also provides a "sync" output, by the way, that could be used for triggering an oscilloscope, but the stability of the rise-time of the sync vs. the rise-time of the actual output pulse may not be too stable

When using this circuit be certain to use good-quality coax and be sure to terminate the end in 50 ohms. Also keep in mind that both the scope and probes you use have an upper frequency limit, so you may measure rise-times that are slower that what you actually have. For the critics in our midst, before you cringe and start to complain, don't lose sight of the performance vs. cost of this generator. I don't think we have exceeded a couple of dollars for everything! At any rate, you get what you pay for, but at least you will have a crude way to produce fast rise-time pulses (even if you have some bounce). If you can come up with a simpler, less expensive way, please let me know and we will be glad to share it with readers.

73, Irwin, WA2NDM

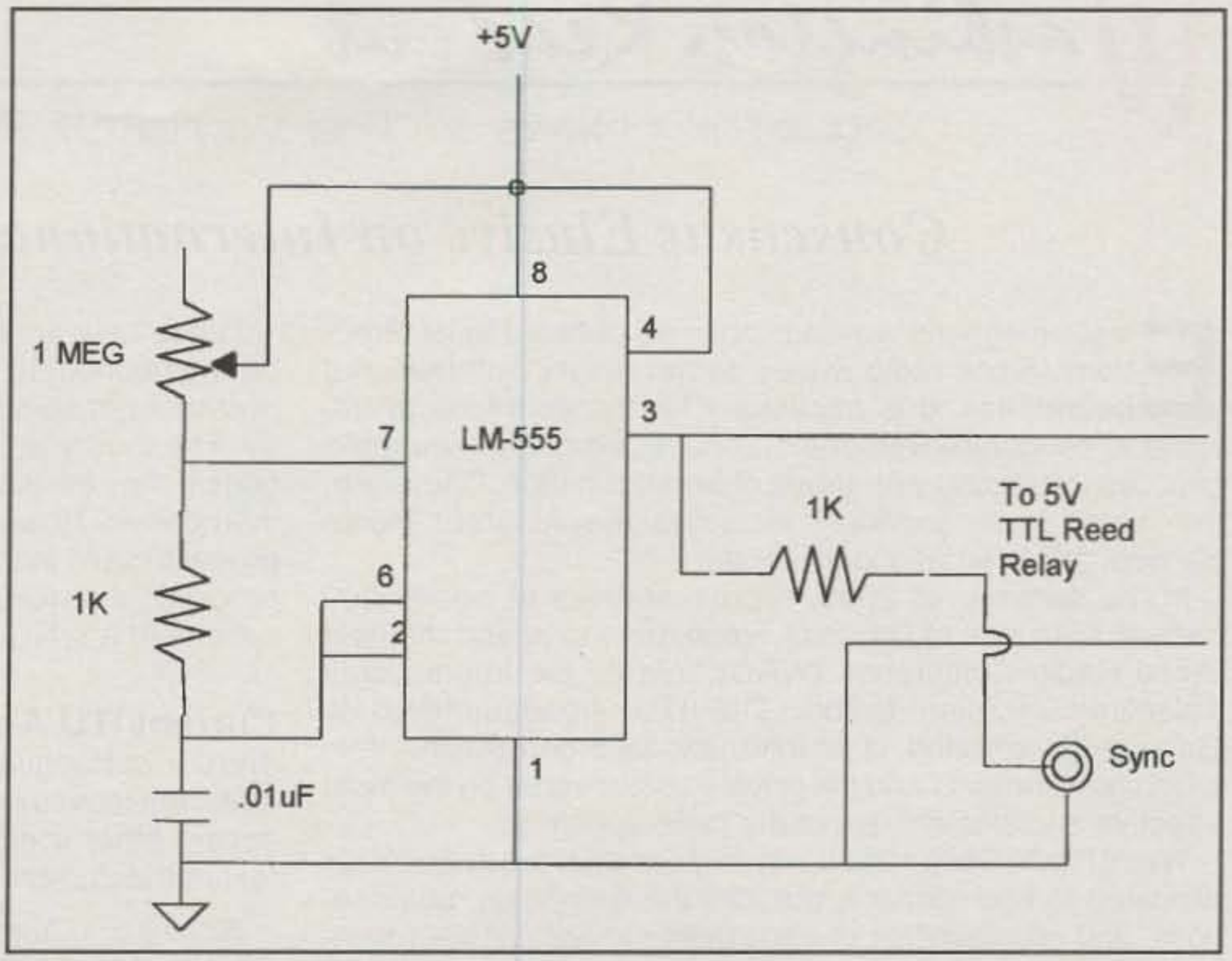

Fig. 3– Relay driver circuit.

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Washington Readout

Regulatory News In The World Of Amateur Radio

BY FREDERICK O. MAIA, W5YI

Consensus Elusive on International Ham Rules

Electromagnetic waves propagate outward in all directions. Since radio waves do not respect international boundaries, it is necessary for the countries of the world to cooperate with one another to eliminate their radio services interfering with those of another nation. Therefore, the major radio services, including the Amateur Radio Service, are international in scope.

In the summer of 2003, representatives of nearly 200 nations will travel to Caracas, Venezuela to attend the next World Radio Conference (WRC) held by the International Telecommunication Union. The ITU, headquartered in Geneva, Switzerland, is an international organization within which governments and the private sector agree on the most effective and efficient use of the radio spectrum.

World Radio Conferences not only consider the frequencies allocated to each service, but also the definitions, qualifications, and requirements of each radio service. WRCs (previously called World Administrative Radio Conferences, or WARCs) used to be convened every couple of decades and considered all radio services at the same time. However, with technology changing faster now, these conferences are held every two or three years with more streamlined agendas.

As you may already know, the 2003 conference has on its agenda the "...possible revision of Article S25," the international regulations governing the Amateur and Amateur-Satellite Services. These regulations provide the framework on which the FCC develops its rules for the Amateur Radio Service in the United States.

Background

At WRC-95, one administration proposed to delete from Article 25 the requirement that radio amateurs demonstrate Morse code capability to be licensed to operate on frequencies below 30 MHz. Instead, a review of Article S25 was placed on the agenda for WRC-99. At WRC-97 this item was moved to the preliminary agenda for WRC-01. At WRC-2000 the item was confirmed on the agenda for WRC-03.

It will be the first "top-to-bottom" revision of the international ham radio rules in many decades, and will likely include changes that have nothing to do with Morse code (such as attempts to carve out a worldwide 300 kHz amateur band at 40 meters). Nonetheless, the matter that is attracting the most attention—and disagreement—from hams in the U.S. is the code requirement. It is widely anticipated that Morse code proficiency as a prerequisite to HF operation will be eliminated as an international requirement at WRC-03.

Amateur Service issues at the ITU are being handled in its Radiocommunication Sector "Working Party 8A." This past spring a draft new-recommendation document developed by the International Amateur Radio Union (IARU) entitled "Minimum Qualifications of Radio Amateurs, ITU-R M. [RAM. QUAL]" was adopted by Working Party 8A. The objective is to have the various administrations of the world accept it.

National Volunteer Examiner Coordinator, P.O. Box 565101, Dallas, TX 75356-5101 (telephone 817-461-6443)
e-mail: <w5yi@cq-amateur-radio.com>

These new amateur radio qualifications are proposed to be "mentioned" in the ITU regulations but linked to another document, a so-called "Incorporation by Reference" strategy. The theory is that it is easier to change future qualifications if they lie outside of the international radio regulations themselves. However, there are some concerns that such a process could lead to changes being made without the "due process" of requiring approval by a majority of ITU member nations at a WRC.

Current ITU Amateur Radio Qualifications

The current language of S25 is quite specific regarding Morse code, but leaves each country tremendous flexibility in determining other licensing qualifications. Here is the complete text of the current rules regarding licensing:

S25.5 § 3. 1) Any person seeking a license to operate the apparatus of an amateur station shall prove that he is able to send correctly by hand and to receive correctly by ear, texts in Morse code signals. The administrations concerned may, however, waive this requirement in the case of stations making use exclusively of frequencies above 30 MHz.

S25.6 2) Administrations shall take such measures as they judge necessary to verify the operational and technical qualifications of any person wishing to operate the apparatus of an amateur station.

The IARU's draft recommendation for revising these sections of S25 eliminates the specific reference to code proficiency, but adds a very specific list of topics that would be required by international law as licensing requirements rather than being left up to individual countries to decide.

The ITU-R Working Party 8A document states that "...any person seeking a license to operate an amateur station should demonstrate theoretical knowledge of ..." followed by a list of topics. Included among those topics is "Methods of Communication" and specifically mentioned is "Radiotelegraphy."

The key word here is *should*, which like *may*, in ITU jargon is a non-mandatory reference. Mandatory words are *shall* and *must*. However, even if the knowledge topics in the international law are not mandatory, the belief is that many nations would consider them compulsory because they are referred to as subjects on which a radio amateur should demonstrate knowledge.

By the way, the word *theoretical* was added to the draft at the insistence of Finland, which was concerned that the document might be interpreted by some countries to mean Morse code testing is still to be required.

Preparation for WRC-2003 At the FCC

The FCC's International Bureau has also formed various industry advisory committees (called Informal Working Groups, or IWGs) that are assisting the FCC, the NTIA, and the Department of State on all agenda items being considered at WRC-2003. The National Telecommunications and Information Administration, an agency of the U.S. Dept. of Commerce, manages the Federal Government's (mostly military) use of the spectrum, while the FCC oversees all other uses (including state and local governments).

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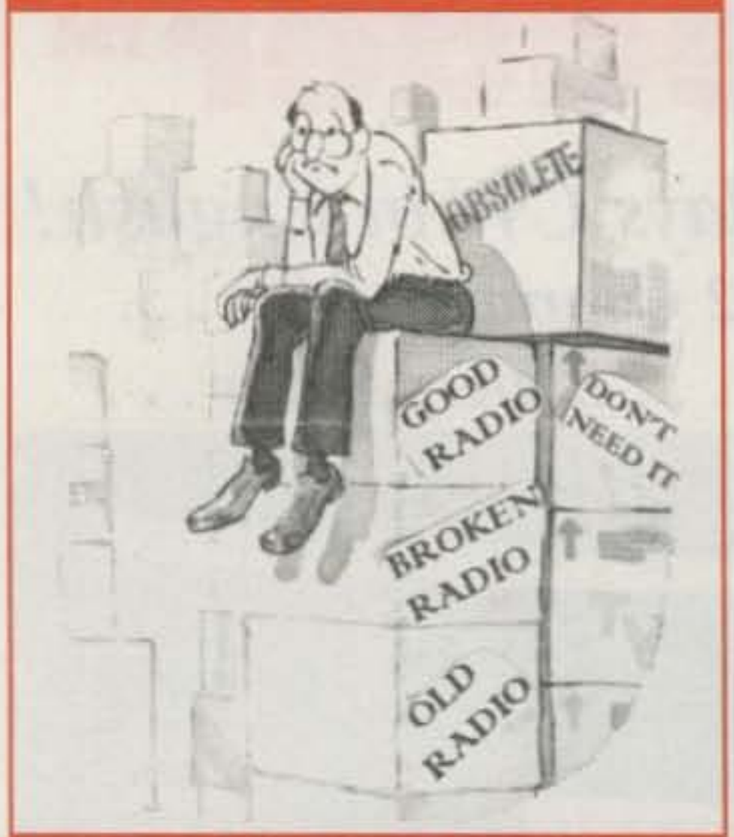

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Amateur radio matters are being handled by Informal Working Group 6, which has been conducting meetings at FCC headquarters in southwest Washington, DC since early this year. The vice chairman of this committee is ARRL Technical Relations Specialist Walt Ireland, WB7CSL. The latest meeting was held on July 11th. The objective of these meetings is to develop a Preliminary View (PV) on each issue.

Only two amateur radio organizations have been represented at these meetings (although they are open to all)—the ARRL and No-Code International (NCI), of which I am a board member. NCI's only goal is to eliminate compulsory Morse code testing as a licensing prerequisite. (NCI is not opposed to CW operation on the ham bands, only Morse code *exams*.)

Proposal by IWG-6

At one of the IWG-6 meetings, NCI asked that all references to the "Minimum Qualifications of Radio Amateurs" be eliminated from the U.S. position, instead going with just the first sentence of the proposed requirements which simply states, "Administrations shall verify the technical and operational qualifications of any person wishing to operate an amateur station." This eliminates specific topics which (like Morse testing) may not be appropriate in future years.

This wording is very similar to the current S25.6 (see above). This position also permits administrations to adopt any further qualifications that they deem necessary.

After much debate, the second line—"A person seeking a license to operate an amateur station <u>shall</u> *[emphasis added—ed.]* be required to demonstrate a knowledge of the topics specified in ITU-R Recommendation M. [RAM-QUAL]."—was stricken from the proposed U.S. position.

NCI suggested that the following line could be added as a compromise in place of the stricken line: "S25.1.(2) The qualifications verified should include theoretical knowledge of the following topics: radio technology, methods of radiocommunication, control of interference, safety, operating practices, and relevant regulations." However, the compromise was not accepted by the ARRL. Instead, the IWG-6 panel accepted as its proposal for the final U.S. position on S25.1 just the first line: (i.e., "Administrations shall verify the technical and operational qualifications of any person wishing to operate an amateur station.").

The July 11th meeting ended with both ARRL Technical Relations Manager Paul Rinaldo, W4RI (who was involved in the ITU Working Party 8 and in writing the original "Minimum Qualifications of Radio Amateurs" document), and ARRL's Walt Ireland, WB7CSL, who is vice chairman of the FCC's Informal Working Group 6, supporting this change.

The FCC staff members at the meeting said they support the draft proposal because it gives administrations flexibility in how they verify qualifications to operate amateur stations (although the FCC apparently likes slightly different wording: "Administrations shall take such measures as they judge necessary to verify the operational and technical qualifications of any person wishing to operate an amateur station.").

When is an Agreement Not an Agreement?

The agreement apparently unraveled before it even got off the table. *CQ* has spoken with several participants in the July 11 meeting and here's what we've been able to piece together.

One participant said NCI's support was contingent on an agreement that the wording of this Preliminary View not be changed in future deliberations. The ARRL apparently felt this condition was impractical for a "preliminary" view and was therefore unacceptable. There was no consensus, so the group voted to approve the wording with a reservation by NCI attached.

The next step would be for the Preliminary View to go to the FCC's Wireless Advisory Committee. Participants were told, however, that the committee has been sending back PVs that come with reservations attached. Apparently, one attempt at a compromise was made, but the ARRL rejected it.

So now it is back to the drawing board. The next meeting of IWG-6 was scheduled for September 4th, when the amateur radio qualifications matter would be further discussed. We will keep you updated as we get closer to WRC-03.

73, Fred, W5YI

Reader Survey
October 2001

We'd like to know more about you—about who you are, where you live, what kind(s) of work you do, and of course, what kinds of amateur radio activities you enjoy. Why? To help us serve you better.

Each time we run one of these surveys, we'll ask a few different questions and ask you to indicate your answers by circling numbers on the Reader Service Card and returning it to us. As a bit of an incentive, we'll pick one respondent each month and give that person a complimentary one-year subscription (or subscription extension) to *CQ*.

This month's issue is a mobile special, so we'd like to find out a little about your mobile operating habits.

Please indicate... **Circle Survey Card #**

1. ...whether you currently operate your ham station mobile (in your vehicle):
- Yes 30
- No 31

Please answer the remaining questions only if you answered "Yes" to Question 1:

2. ...the bands you operate from your vehicle:
- HF only 32
- VHF/UHF only 33
- HF and VHF/UHF 34

3. ...the mode(s) you operate while mobile:
- Amateur TV 35
- CW 36
- Digital 37
- FM 38
- SSB 39
- Other 40

4. ... the type(s) of vehicle(s) from which you operate:
- Airplane 41
- Automobile 42
- Bicycle 43
- Boat 44
- Heavy truck 45
- Light truck/Van/SUV 46
- Motorcycle 47
- RV/Trailer/Camper 48
- On foot 49
- Other 50

5. ... whether you primarily operate mobile
- While operating your vehicle 51
- As a passenger while in motion 52
- Stopped at a location away from home 53

6. ... your primary time/activity while operating mobile:
- Commuting 54
- Traveling 55
- Driving specifically for ham radio purpose (e.g., giving out counties, "rover" contest operating, driving to a remote location to operate) 56
- DXing 57
- Rag-Chewing 58
- Contesting 59
- Other 60

Thank you for your responses. The Survey Department will be taking a couple of months off to go snorkeling in Acapulco. We'll be back in January with more questions.

What You've Told Us...

Our August survey asked about your attitudes toward and activity in on-air contesting. The results, as always, were quite interesting.

To no one's surprise, 73% of *CQ* readers who responded to the survey said they operate contests at least occasionally. Of that group, 25% consider themselves serious (or addicted) contesters, and 75% (56% overall) classify themselves as occasional contesters. Feelings about contesting were generally positive, with 46% of respondents saying it's helpful for working new stations, countries, etc.; 42% feel it helps build technical and operating skills; 39% say contesting is fun and competitive; and 14% believe it's good training for emergencies. In addition, 21% said they don't enjoy contesting themselves, but see how other people do; and 5% consider it a waste of time and spectrum.

Among those who operate contests at least occasionally, 45% say their primary goal is to have fun, while 27% say they use contests to make contacts for operating awards, 23% want to beat their own previous scores, and 14% are in it to win. Another no-surprise is that 85% of that same group operate SSB contests, with a very respectable 60% operating CW contests. Only 16% operate RTTY/digital contests and 11% operate FM during contests.

We were surprised with the responses to questions about logging and submitting logs, as nearly half of contest operators (45%) still use paper logs and over half (52%) submit their logs by mail, on paper. Other responses included 40% who use special contest logging programs on their computers, 11% who use general logging programs, and 12% who use a combination of methods. A little more than one-third (37%) submit contest logs by e-mail, while another 11% send a diskette through the mail. Another interesting note is that 37% of you rarely or never submit contest logs; you're just in it for your own enjoyment. On the other hand, 38% always submit logs, 14% submit if they get around to it, another 12% submit only if they've done well.

This month's winner of a free one-year subscription to *CQ* is James Hayes, N2YEV, of Plattsburgh, NY. As always, thank you to all who responded to our survey.

What is amateur radio all about? When the bands are dead, we talk about it. When our antennas are down, we talk about it. Indeed, our hobby has given us much pleasure over the years. However, it's also had a fascinating history that has helped change the way all of us communicate. N8PB invites you to join the effort to record and preserve that history.

Preserving the History of Ham Radio

BY PETE BUEHNER,* N8PB

When I wrote my March editorial proposing a CQ Ham Radio Oral History Project, I completely forgot that we had an article on the topic waiting to be published. N8PB provides not only another avenue for preserving ham radio history, but also a means to search for significant events and their participants. With apologies to Pete for this oversight, we encourage you to consider his option as well as the Oral History Project Forum area on the CQ website. — *W2VU*

The history of amateur radio has spanned nearly a century. Several generations of operators have been mesmerized by its magic. Present-day hams are merely a part of that long lineage, which also includes the early radio pioneers and broadcasters. They, too, shared our fascination with wireless. Although the path that led to our present technological "prowess" is interesting, it's becoming increasingly difficult to retrace our origins.

The original old timers and Elmers are gone, and consequently a part of ham radio slowly continues to fade. Many important early events were poorly documented, and we are in danger of losing some of our precious history to the sands of time.

The Ham History E-mail Reflector

In September 1998 the Ham Radio History E-mail Reflector was created in an effort to research and preserve as much of our hobby's past as possible. With the help of *QST* (in a "Strays" column), I invited all enthusiasts of radio communication to join and contribute whatever thoughts, reminiscences, and recollections they had. We now have several hundred permanent subscribers on the reflector throughout the world. Many of our subscribers are old timers, professional historians, college professors, retired shipboard and shore station operators, writers, researchers, nd DXers. On many occasions we've had some very interesting and thought-provoking exchanges.

The "Gibson Girl." The first emergency rescue beacon transmitter saved several lives, beginning in World War II. (Photo from the "Wireless For The Warrior" webpage, courtesy Louis Meulstee, PAØPCR.)

A Search Engine That Digs Through History

The Ham Radio History E-mail Reflector is served by a website which has archived the thousands of contributions by the subscribers—all of which can be accessed using the site's own search engine. Everyone is invited to enjoy, contribute, discuss, and/or share whatever trivia, reminiscences, facts or recollections of ham radio's past they can.

Topics have ranged from the obscure to the explosive. We've discussed the methods of communication prior to the discovery of electricity, the first successful wireless demonstration in 1865, the controversial development of the Morse code (Vail code?), the technological obstacles that were encountered while laying the first Transatlantic cables, and the neighborhood telegraphy clubs whose members connected to each other by landline—even before the dawn of radio.

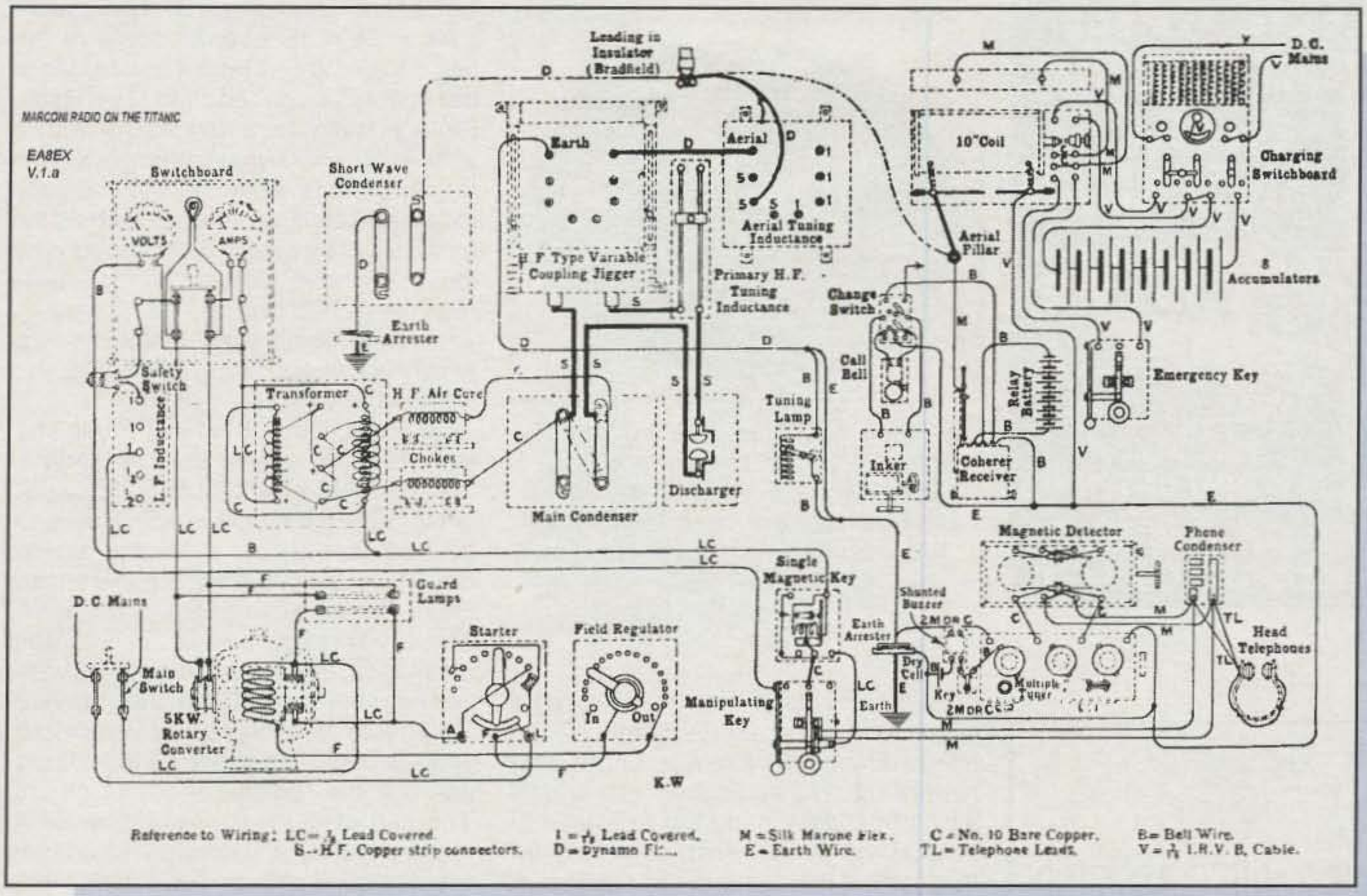
We've also discussed the emergency rescue "Gibson Girl" transmitters, the schematic of the Marconi Wireless room aboard the *Titanic,* the recent closing of the maritime CW shore stations, and the present changes occurring in ham radio and how they mirror similar controversial changes of the past. All of it is a wonderful collage of recollections, facts, and trivia. You can never tell what the next subject will be about and when it will pop up.

Events That Molded Amateur Radio

The discussions also include many of the events that have helped shape our hobby into what it is today. Many of those events were dubious and controversial and, more often than not, less than flattering. For example, few, if any, early "gentlemen's agreements" were ever honored. The fact that frequency selectivity was virtually non-existent during the early years of radio and that the number of amateur "homebrew" stations sometimes exceeded commercial ones, always assured that significant QRM would be present. At first the government was powerless to control the fledgling experimenters, but one significant event soon precipitated change.

In the early morning hours one day in April, 1912, the *SS Carpathia,* carrying

*e-mail: <N8PB@arrl.net>



Actual schematic of the RMS Titanic*'s wireless room. It was quite sophisticated for its time. (Courtesy Francisco Jose, EA8EX)*

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A Gibson Girl "SOS" wheel taken from the life raft of a downed U. S. Army Air Force B-17 bomber. Every little piece of history is significant. (Photo copyrighted by Neal McEwen, K5RW; used by permission.)

the survivors of the *Titanic*, finally came within communications range of the North American wireless shore stations. Almost immediately, false signals and other QRM made the reception of the survivor list extremely difficult. Later that year, largely due to the public outcry, the first of many regulations was imposed upon wireless operation. On the Ham Radio History's archive website, using its search engine, you can locate a copy of the actual documentation that was released following the Senate inquiries at that time and the subsequent rulings that were issued. This and many other subjects have been discussed.

A Cordial Invitation To Participate

I invite everyone to join and participate in the Ham Radio History E-mail Reflector. Perhaps you, too, might have a piece of radio trivia that others will find amusing, interesting, or maybe even significant. Help preserve ham radio's past while rediscovering some of our lost origins. We all hold a few pieces of the history puzzle, and the Ham Radio History Reflector provides us with a vehicle to share that information with the rest. Share what you know about it today, and enjoy reading tales about the past as told by others. Even though you may only have planned to "passively read the mail" on the reflector, it may jog your own memory about events with which you were involved or that you heard about.

To subscribe to the Ham Radio History reflector, simply send a blank e-mail to: <ham-radio-history-subscribe @eGroups.com>. Once you have subscribed, you will automatically receive details by e-mail explaining what the Ham Radio History Reflector is all about, how to participate, how to post messages, and unsubscribing information. Remember, this a free service! Once your subscription is completed, you will begin to receive historical nuggets via the reminiscences of others. You can also set your preferences to receive Ham Radio History messages via digest format or have messages held for you on the web.

In addition, everyone is invited to visit the Ham Radio History archives and research subjects (using the search engine available at the site) that have been posted previously by subscribers (i.e., the origin of the SOS, early amateur radio stations involved in public broadcasting, Conelrad, biographies, amateur radio in foreign countries, and so on). Simply point your browser to: <http://www.eGroups.com/list/ham-radio-history>.

Please join us. The amateur radio history you save may be your own. Every contributor possesses a piece of history. The more contributors there are, the bigger the pool of knowledge we all get to share. ■

Acknowledgements and Resources

The author would like to thank the following amateurs for their assistance, and recommends their websites for additional information on various aspects of radio history:

Neal McEwen, K5RW, for his valuable assistance, photos, and excellent webpage, "The Telegraph Office," which is dedicated to recording the history of telegraphy from the beginning of electronic communication to the present. Website: <http://www.metronet.com/~nmcewen/tel_off.html>.

Francisco Jose, EA8EX, for his restoration work on the Titanic's Wireless room schematic. Website (courtesy of K5RW): <http://www.metronet.com/~nmcewen/tel_off.html>.

Chuck Rippel, WA4HHG, for his dedication to the preservation of classic military radios. Website: <http://www.avslvb.com/R390A/html/radio_rape.html>.

Glenn Dunstan, VK1XX, for his RMS Titanic Radio page, photos, and providing excerpts of the emergency radio log traffic. Website: <http://www2.dynamite.com.au/rmstitanic/>.

Louis Meulstee , PAØPCR, for photos and for maintaining a comprehensive page on the history of "Wireless for Warriors." Website: <http://home.hccnet.nl/l.meulstee/gibsongirl/ gibsongirl.html>.

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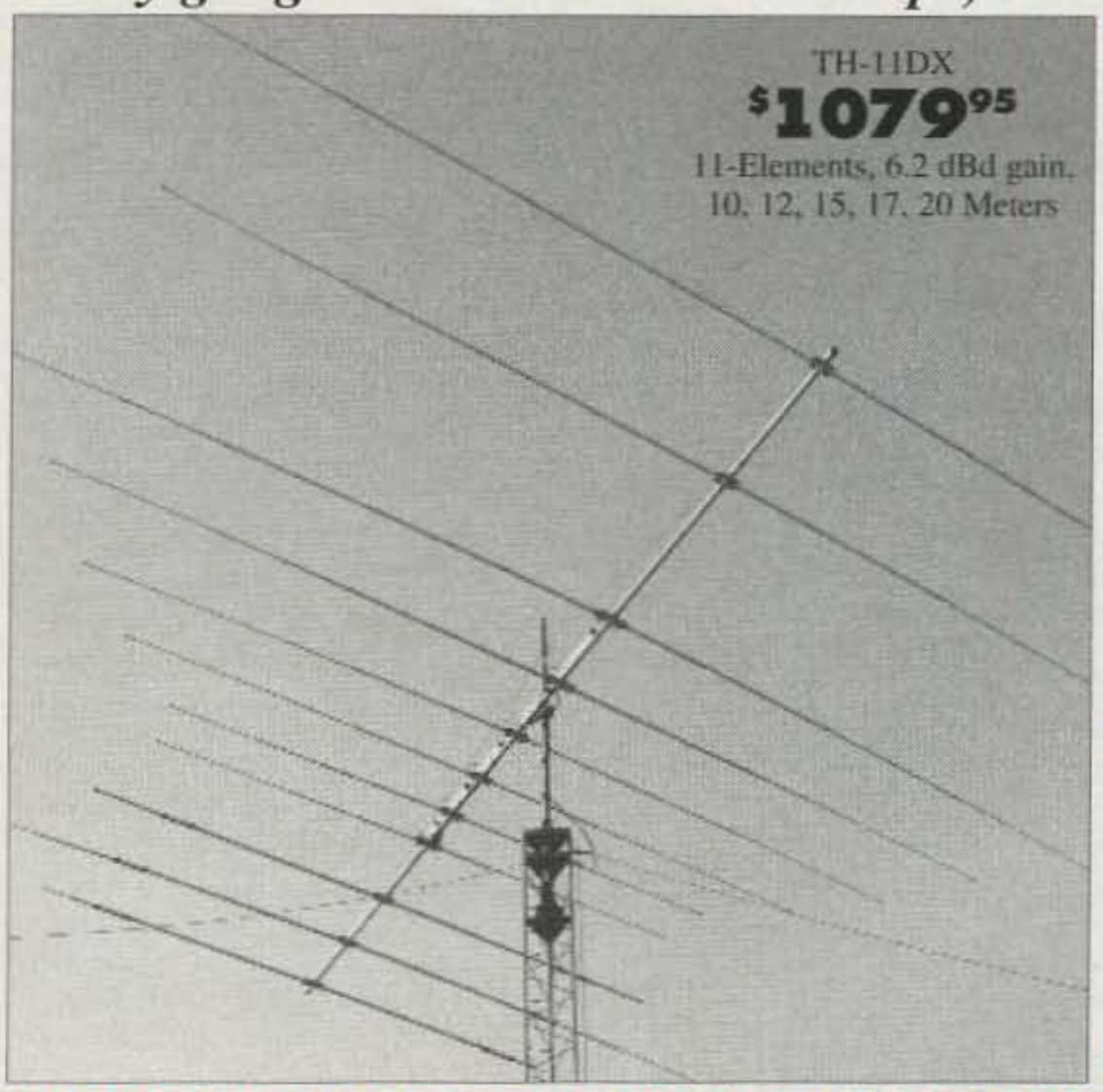

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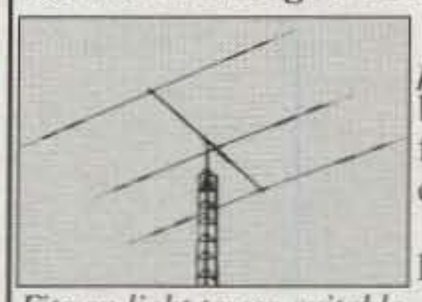

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TH-5MK2	5	6.1	20	1500	10, 15, 20	7.4	100	19	31.5	18.42	57	1.5-2.5	HAM-IV	$699.95
TH-3MK4	**3**	**5.8**	**25**	**1500**	**10, 15, 20**	**4.6**	**95**	**14**	**27.42**	**15.33**	**35**	**1.9-2.5**	**CD-45II**	**$439.95**
TH-3JRS	3	5.8	25	600	10, 15, 20	3.35	80	12	27.25	14.75	21	1.25-2.0	CD-45II	$329.95
TH-2MK3	**2**	**3.4**	**15-20**	**1500**	**10, 15, 20**	**3.25**	**80**	**6**	**27.3**	**14.25**	**20**	**1.9-2.5**	**CD-45II**	**$339.95**
EXP-14	4	5.9	25	1500	10,15,20 (75 to 50Ω)	7.5	100	14	31.5	17.25	45	1.9-2.5	HAM IV	$549.95

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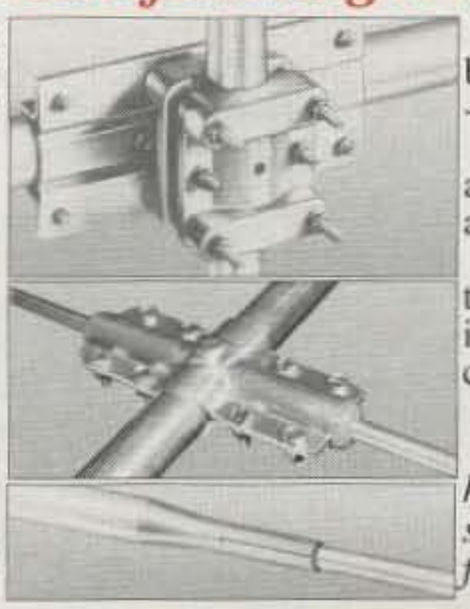

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VHF Plus

BY JOE LYNCH, N6CL

All About The World Above HF

WSJT Hitting WS VHF MS by Storm (Translation to Follow)

So what does this alphabet-soup headline mean? WSJT is the latest software program being used by meteor-scatter (MS) enthusiasts to complete heretofore very difficult contacts in the weak-signal (WS) arena of the VHF ham bands. The pun intended is that it has hit the weak-signal community by storm at just about the right time!

The new WSJT software had its first test during the *Perseids* meteor shower this past August. From all the reports received, it performed quite nicely. Below are excerpts of several reports from users of WSJT.

Developed by Nobel laureate and *CQ* Amateur Radio Hall of Fame member Joe Taylor, K1JT, this software program has astounded its users with the ease by which meteor-scatter contacts have been completed—even in what previously have been considered the most marginal conditions.

"Who is Joe Taylor?" you might ask. It was in 1993 that Joe first came to amateur radio public attention when he, along with Russell Hulse, ex-WB2LAV, won the Nobel Prize for Physics for their joint 1974 discovery of the first binary pulsar. The binary pulsar is a twin star system that gives researchers a rare natural laboratory in which to test Albert Einstein's theory that moving objects emit gravitational waves, as well as other aspects of his general theory of relativity.

Joe's academic work seems to have had him always looking at the sky. During his undergraduate work at Haverford College he built a radio telescope as a senior honors project. (He used a copy of the *Radio Amateur's Handbook* as one of his references.) Later his graduate work took him to Harvard in the physics, astronomy, and applied mathematics subject areas. Since graduation from Harvard, Joe has spent almost his entire career in academia, first at the University of Massachusetts and more recently at Princeton.

Now, eight years after his Nobel Prize, it seems that with the development of the WSJT software, Joe's attention continues to be skyward as he makes a new discovery—this one a hit software package on the first try! Judging from the immediate overwhelming positive response, it is sure to win a prize for the most innovative development in weak-signal communications in a very long time.

Some History of WSJT

Here are Joe's words as he has shared with his beta testers and with your editor:

In February of this year, after recovering from the January VHF Sweepstakes, I devoted some evenings and weekends to writing a computer program that would read audio recordings produced by WinMSDSP and translate the high-speed CW (HSCW) into plain text. The program worked, and indeed I found that it could read the 6000 to 10,000 LPM Morse code in meteor pings somewhat better than the little-used "Decode" feature of WinMSDSP does it. I even sent a copy of the program to Shelby Ennis, W8WN, and together we tried some crude on-the-air HSMS QSOs using it.

The result was rather like the famous talking dog: People were so amazed that the dog could talk at all, nobody minded much that he could only say three words and was very difficult to understand. Shelby and I agreed that the program did not even come close to matching the effectiveness of WinMSDSP in the hands of a good CW operator.

Shelby went on to offer an opinion that beating the ear-brain system with an all-digital computerized approach was a very tall order indeed, and was probably not going to happen. I decided to accept his opinion as a challenge, and WSJT has evolved as a result.

What is WSJT?

Again quoting Joe:

WSJT stands for "Weak Signal communications, by K1JT." It provides a high-speed mode for amateur communication via pings from underdense meteor trails, and plans call for expansion to support the PUA43 and EME-2 protocols designed by W7PUA for very slow tropo and EME communications. However, only the meteor-scatter mode is implemented in the version distributed for beta testing as WSJT version 0.93.2. *(Editor's note: Version 0.93.2 was the current beta version as of our deadline for this column. Please check the WSJT URL: <http://pulsar.princeton.edu/~joe/k1jt/> for the latest version of the software.)*

WSJT is a work in progress, but is very usable in its present form. Indeed, I would argue that WSJT already represents a significant improvement over HSCW for meteor-scatter work—but no doubt others will soon form their own opinions on that score.

The program uses 4-tone frequency shift keying (FSK) to encode arbitrary messages, and in addition it seamlessly and very sensitively integrates the single-tone encoding of four short and critical messages frequently sent in HSCW QSOs: R26, R27, RRR, and 73.

After many on-the-air tests of early program versions in March through May of this year, Shelby, W8WN, and I began testing the basic algorithm that powers version 0.8 in early June with excellent results. We have now completed many QSOs with it on both 2 and 6 meters, with the usual sporadic meteors and dead band conditions.

We found WSJT to be at least the equal of HSCW, and in some ways considerably better. Its DSP algorithms have a knack of detecting pings which by ear would be categorized as "S1" or "S0"—or perhaps not even be heard—and converting them into solid copy!

I was indeed active with WSJT during the two weeks leading up to the *Perseids* shower, and especially on the weekend of August 11–12. (HSMS techniques do not really require meteor showers, of course, but both the extra meteors and the extra activity help to get QSO rates up at these times of the year.)

I do not have a big station: on 2 meters, a 9-element Yagi at 45 feet and a 160 watt brick. Nevertheless, over these two weeks I made 46 meteor-scatter QSOs in 27 different grid squares. As usual for meteor-scatter communications, nearly all contacts were at distances of 500 to 1300 miles. I managed three new states and I think 11 new grids, bringing my 2 meter totals to 33 and 100, respectively, over just the past two years.

Just for fun, I kept track of the North American callsigns noted on the August 11–12 weekend using WSJT for meteor-scatter work. I counted a total of 83 calls in 66 different grid squares. Even for those of us in the northeast, where only a bit more than a compass quadrant has much activity in it, nearly half of the country was workable with WSJT and a decent (but not EME class) station.

I have been told that [as of this writing] WSJT is now in regular use by perhaps 500 hams in Europe, from about 50 DXCC entities (and goodness knows how many grids). The program is also in use in South Africa and probably Australia by now.

I have many plans for future enhancements of WSJT. In addition to the implementation of PUA43 and EME-2 modes, these include significant enhancement of the decoding algo-

VHF Plus Calendar

Sept. 25	222 MHz Fall Sprint. (See text for details.)
Oct. 2	Full Moon.
Oct. 3	432 MHz Fall Sprint. (See text for details.)
Oct. 7	Poor EME conditions.
Oct. 9	Last quarter Moon and highest Moon declination.
Oct. 13	Moon perigee. 902 MHz and above Fall Sprint. (See text for details.)
Oct. 13-14	First weekend of the ARRL EME Contest. (See text for details.)
Oct. 14	Excellent EME conditions.
Oct. 16	New Moon.
Oct. 20	50 MHz Fall Sprint. (See text for details.)
Oct. 21	*Orionids* meteor shower predicted peak. Very poor EME conditions.
Oct. 22	Lowest Moon declination.
Oct. 23	First quarter Moon.
Oct.r 26	Moon apogee.
Oct. 28	Moderate EME conditions.
Oct. 31	Full Moon (Blue Moon).

• EME conditions courtesy W5LUU

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rithms, better rejection of gibberish created by static crashes and other QRN, and a number of operator convenience features—many of them suggested by the ever-increasing group of enthusiastic users. All I need is time to work on the program, hi.

Technical Details

The following is from text files available from Joe's website:

As mentioned above, the first mode implemented, and the one that has given WSJT its wide initial popularity, is called FSK441. It is designed for high-speed meteor-scatter (HSMS) communication using "pings" reflected from the underdense ionization trails of random meteors at about 100 km height. Such pings are typically a few dB above the noise and last for anywhere from ten to a few hundred milliseconds.

FSK441 uses Frequency Shift Keying at a baud rate of 441 Hz. Four distinct tones are used, namely 882, 1323, 1764, and 2205 Hz. Each encoded character uses three tone intervals and therefore requires 3/441 seconds (approximately 2.3 ms) for its transmission. FSK441 accommodates a potential "alphabet" of 48 characters. The present encoding scheme uses 43 of these characters, the same ones used in the PUA-43 alphabet.

The present encoding of each character is defined in Table I. The four tones are labeled 0–3 for the tones 882 through 2205 Hz, in increasing order. The four possible "single-tone" encodings— namely 000, 111, 222, and 333—are reserved in WSJT for special use as shorthand messages. (These characters sent repeatedly amount to pure single-frequency carriers, and their pings are easily recognized by the software and by the human ear.)

The present definition of the shorthand messages is respectively R26, R27, RRR, and 73. These messages are very widely used in North American HSMS communications.

Overview of Features

Joe points out that WSJT uses the same hardware and operating system requirements as PSK-31, MFSK16, and other PC soundcard-based ham software. It makes highly effective use of SSB audio bandwidth, with a clean transmitted spectrum. It is very high speed—147 characters per second, or 8820 LPM. It converts many S0 and S1 pings to solid copy on critical short messages. There is no requirement for slow playback and copying by ear, which means you don't even need to be proficient in Morse code!

The required equipment items for WSJT are as follows: an SSB station for one or more VHF bands; a computer running Windows® 95, 98, or ME (Windows® NT, 2000, and other versions may work, but have not yet been thoroughly tested.); a 75 MHz Pentium or faster CPU; a monitor with 800×600 or higher resolution; at least 32 MB RAM'; at least 40 MB of free disk space; and a Windows® compatible soundcard. All sampling is done in 8-bit monaural mode at 11025 Hz.

Station interface is like those required for WinMSDSP, PSK-31, Hellschreiber, etc. The DTR or RTS line of a COM port is used to key your transmitter's PTT line. Standard connections are required between your

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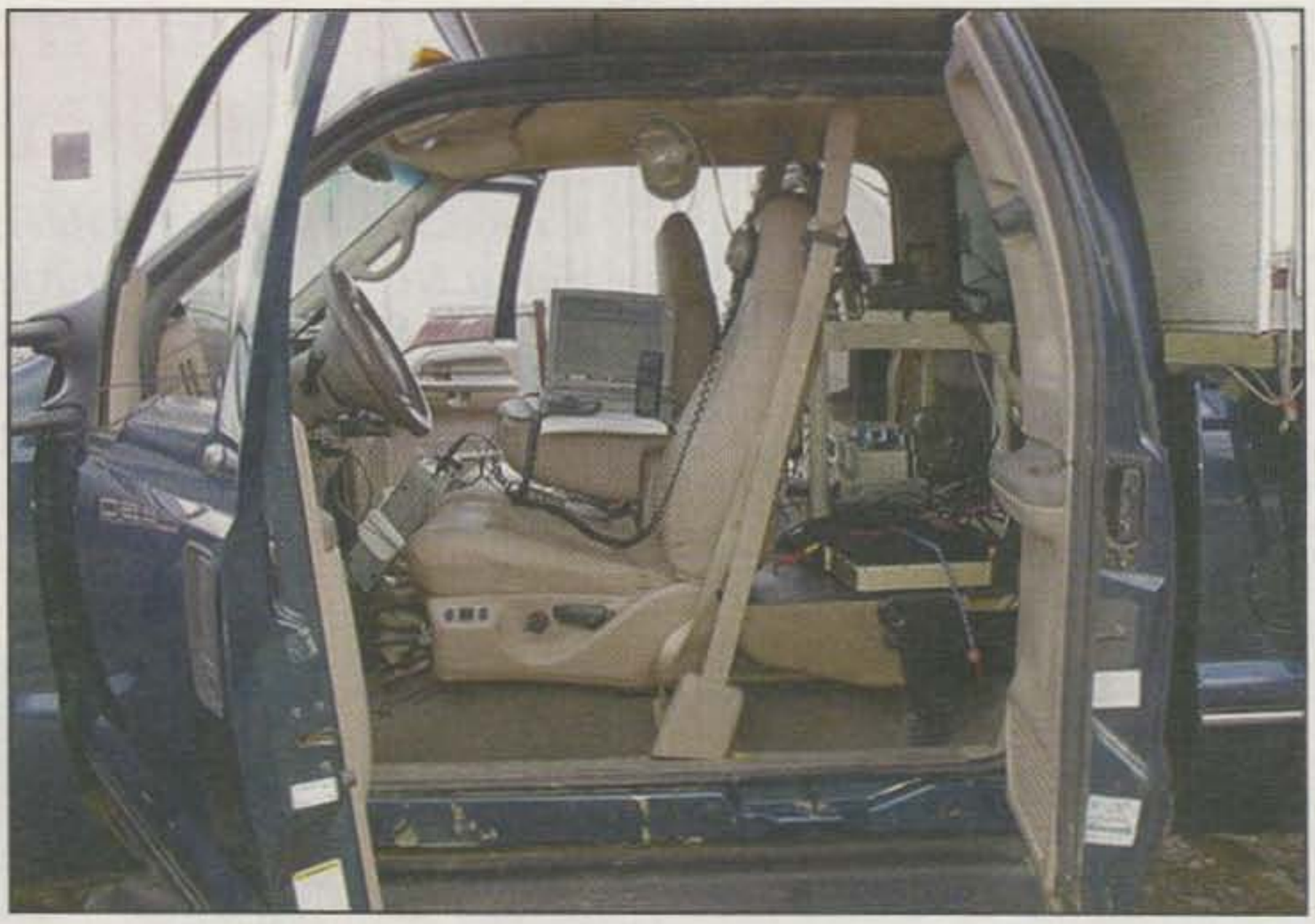

Inside view of John Walker, WZ8D's truck on his recent grid expedition to Canada.

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Is WSJT an All-Purpose Program?

Considering that next month's *Leonids* meteor shower might be a storm, I queried Shelby concerning the lack of universality of propagation applications of WSJT, suggesting, "Perhaps good old-fashioned SSB might still be in vogue, especially for that shower (storm?)."

His answer was: "Most definitely! We don't recommend HSMS for the peaks of the big ones. That's when SSB is far more efficient. Use HSMS for distant/difficult skeds, the period leading up to the peak, etc.—and especially for every morning and evening when there aren't any showers. For the peak itself, even for a good *Perseids*, SSB is the way to go."

A lot is being touted about WSJT and presently it is the most promising HSMS program out there. Shelby related to me: "Tihomir Heidelberg, 9A4GL, author of MSDSP and WinMSDSP, suffered a hard disk crash and has lost all of his code, so MSDSP is now an orphan—no more updates of it. It will not run fully on Win 2000 (I don't have any details), so in a few years we're going to need a new HSCW program."

Shelby, among others, is urging Joe to include an HSCW function in WSJT. However, as with all other acts of love (as this program is for Joe), it will have to wait for available time for the updates.

Users are Saying . . .

Your editor received the following reports with the assistance of Joe Taylor, K1JT, and Shelby Ennis, W8WN:

Andy Flowers, KØSM (EN10): "I run 160 W

John, WZ8D operating from his camper semmingly out in the middle of nowhere in grd square FN09 in Canad. (Photo via WZ8D)

to a 13-el yagi at 55 feet from my home in EN10rt, near Lincoln, NE. I have done both regular SSB/CW MS for about 5 years, and I've also been on HSCW for about the same amount of time. I have come to the conclusion that WSJT is superior to other MS operations in just about every respect. It is also much easier to use and set up than HSCW is—many people already have all of the cables anyway!

"The *Perseids* was the first major shower in which we've used WSJT. Many of the stations in the 1000 mi range are very similar to mine, or even smaller, thus proving that the 'little guy' can work DX on 2 m! The 1200/1300 mi stations are usually a little bigger. My best DX is K9KNW/EL95 at 1338 mi, and that took about 40 min outside of any major shower! I heard W4WHN/EL94 at 1430 mi the next day, but just not enough bursts to complete the QSO.

"During the shower there tended to be longer bursts (overdense bursts), which were often fluttery. These are good for SSB *if* signals are strong enough. Without a KW, sometimes I hear folks who just can't hear me! I completed both skeds on 35 wpm CW using these long and not so strong signals, which I find to be the most effective under shower conditions (easy on voice too!). Outside the peak of a major shower, WSJT is hands down the winner. MS conditions vary from day-to-day, just like any other propagation mode. Until now, we never really took notice of the underdense pings because they were useless.

"In my opinion, WSJT is the best thing that's happened to VHF in a very long time...not that I've been around for eons or anything. It brings new life to VHF in that people can be active and making QSOs all the time. Small stations out west now have a reason to be active on VHF, which, from what I understand, is a pretty discouraging environment unless you have an EME-class station. It also makes a *great* contest accessory for picking up multipliers on early AM skeds, and opens up the possibility of DX-peditions outside of any showers or contests."

From **Dave Witucki, N8OC**: "From the week preceding the peak (started 5 August) to this writing (now Sunday night) I worked 31 WSJT contacts. Was a little "picky" over the last few days, looking for new states and grids, so didn't work a lot of the guys I always work, or would have many more I'm sure. On 2 m ended up with 28 new grids and 6 new states (LA, NH, SD, ME, TN, VA). Best contact was with W4WHN on 06AUG01 ending 1222Z (EN83ao – EL94hq) 1314 miles. Was a little disappointed that more of the ops to the west of me didn't give it a try; seemed a lot of SSB skeds were popular that a way.

"I picked up a couple more grids on tropo (while trying MS) and one on SSB ms, one HSCW for a new state on 2 m, RI. All in all, not bad. Started working MS in November 2000; really enjoy weak-signal VHF. My equipment is 160 W into 17-el M² 5WL at 55 ft here on 2 m, so not a big gun by any means."

From **Jerry Summerall, K7YVZ**: WSJT is the best thing to come around in some time for making contacts VHF via meteor scatter, and to top it off it actually works. Made four contacts ranging from 700–1200 miles this weekend. Hope to see more stations become active in order to take full advantage of MS and rack up a few more new grids that would otherwise be impossible. Makes SSB contacts practically useless.

"I have always been into VHF weak-signal and meteor scatter was another tool to use to make contacts. I enjoy the fast pace. Started on SSB but then heard about HSCW and used it for several years until WSJT came along. Been using it for three weeks.

From **Jacques Verleijen, ON4AVJ**: "I had the opportunity to test this software during the *Perseids* and I must say it is really amazing. From 1 August I started to test the software on a Win2000 PC and I experienced no problems with it. No crashes and the PTT is working fine also (using an transistor as interface on the DTR from the com port). I know this is not very safe for the com port when it is build on the motherboard, so I will make a new one with an optocoupler.

"I made 20 QSOs in WSJT and most of them only with 80 W (18 QSOs) covering distances between 750 km and 1920 km. It is amazing how the smallest ping can be decoded with useful information, even when there are frequencies where the use of my notch filter was necessary to eliminate QRM/N. TK5JJ even managed to copy my signals on 'plane scatter' (he lives nearby an airport).

"I had some difficulty decoding large bursts with strong signals. I think that there the software can be approved. Another small inconvenience is the cursor in the plot window when you want to manually decode a part of the message (the cursor stays black).

"But it is a very great piece of software that

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K1JT wrote specially for the use in sporadic showers. It will change the practice of MS drastically I think. I enjoyed working with WSJT and it surely motivated me in the practice of sporadic showers."

From **Udo Langenohl, DK5YA**: The WSJT software was *the* mode here in Europe during the *Perseids* shower. All in all, thousands (!) of WSJT QSOs were made and we've got two new DXCC countries on the air, CN8 and EA8, thanks to the new software.

From **John Fridenstine, W8PAT (EN81vg):** "I had mixed results over the past ten days. Eighteen skeds, most set up on Ping Page, two prearranged, nine complete. Station here is FT736 and SS Amps, 150 watts on 6 meters, 160 watts on 2 meters, and 70 watts on 222 MHz. Antennas Cushcraft 617B on 6 meters, 16-ele KLM on 2, and Cushcraft 220B on 222. The best rocks here seemed to be from 1330–1700 on August 12.

"WSJT has brought new digital operators to meteor scatter and has brought back some excitement for the old-time ping jockeys. Great tool. Still it takes experienced operators to get the most out of it. The newer fellows learn fast though! Still can't work them without rocks!"

From **John Walker, WZ8D**: "Here are some totals and a few comments of my trip. I put three rare grids on with a portable setup: EN87, EN88, and FN09. I had a total of 473 Qs from these three spots, 20 Qs were with WSJT.

"While mobile I operated from 27 grids with about 200 contacts; 35 contacts were WSJT, most with W8WN and WB5APD. I worked them in most of the grids I was mobile in.

"WSJT is going to be a big plus for VHF and UHF. Shelby, W8WN, sent me a copy of the program the day before I left. WB5APD helped me set it up over the phone. I made my first contact with him while mobile through EN70. He is in EM84.

"I learned how to run this thing while mobile; anyone can do it if I can do that. I then worked Bob in almost every grid on the way to EN87. Most here new grids for him. I also worked him in many of the same grids all the way home. The antenna would sometimes be 180 degrees off of him (10-ele Chuscraft mounted 30 inches above the camper with 250 watts). I could get calls from weak split-second bursts. Some I could not even hear.

"This software program is going to change the way we do VHF. It was a blast and anybody serious about running up their grid totals had better get it now.

"I operated this thing while driving down the road at 70 mph. I had a laptop strapped to the console.

"Most contacts on this trip were by scatter. I did have some *E*-skip on 6 meters and a double-hop contact with K2RTH in FL95 2437 KM. My best contact on 2 meters was W0VD 1800 km with WJST from FN09. Also from FN09 I made four contacts on one 1.5 minute burn on 2 m at 14:16 UTC on SSB. They were W1AIM, W8ANS, AK3E, W1NG. They were 20 over 9.

"Another burn I worked W4HP and N8XA. N8XA was running less than 10 W and he was S9. I worked K8TQK on 2 m SSB from all three grids. He had the best 2 m signal on scatter."

From **Ken Tentarelli, AC1H**: "I installed WSJT just one week before the start of the *Perseids*. I was only able to run in the mornings on Aug. 10 and 11 (missed the peak day, Aug. 12) and the tally for those two days was 10 grid squares on 2 m. All contacts were completed in about a half hour, including one QSO over 1250 miles with KMØT. Only failed to complete on one QSO and that also was over 1250 miles.

"I've been running meteor scatter for many years and recall how it could take persistence over several skeds lasting hours to complete QSOs over 1200 miles. Recently, HSCW reduced that burden and now WSJT has taken another big step forward. Without a doubt, WSJT certainly ranks up there among the biggest breakthroughs we've had in weak-signal communication."

From **Mike King, KMØT:** "Regarding the weekend's *Perseids* meteor shower, it was a good few days here in the heartland. The combination of WSJT, SSB, and HSCW produced 32 QSOs in 23 states and two provinces for a total of 26 grids; 20 QSOs on WSJT, one HSCW, and the rest SSB. All QSOs were on 2 m. (I did have one on 6 m SSB as well.)

"WSJT was definitely the mode of choice and persevered in all conditions except for the hour of peak SSB activity mid-morning on Sunday. The only thing that kept the QSO count down on WSJT was that I worked all I could that were on the mode. I worked as far east as FN41 and FN43, west to DN07, southwest to DM43, south to EM11, EM31, and southeast to FM15.

"It is interesting that the longest distance QSOs were SSB meteor scatter and HSCW. This, however, is only true because these folks were not on WSJT. My guess is that the QSOs would have been done in 10 minutes or less had they had WSJT. The average of QSO length here was under 10 minutes for WSJT.

"I got WSJT set up Thursday night and made my first QSOs then. WSJT was easy to learn and a piece of cake to operate without messing with any settings. Now that I have a number of QSOs under my belt, I will be able to fine tune the decoding parameters as I begin to understand what they do.

"All this was done with 150 W output (from my 300 W brick) to two vertically stacked 14 ft. Yagis, space 9.5 ft. apart; the top Yagi is about 70 ft. high. No mast mount preamp.

So as one can see, one can do some serious damage on the VHF bands if one wants to with WSJT!"

From **Dick Ray, W5SNX**: "I have been active on 2 m since 1954. My QTH is Stone Mountain, GA (18 miles NE of Atlanta in EM73wt.59). I started using HSCW (MSDSP program) about three years ago. Around June 23, 2001, I agreed to work in a beta group to wring out K1JT's new program, WSJT. Since that time I have made 91 contacts with 41 different stations.

"This program has a few minor bugs left, but works very well. I believe it works a good bit better than the HSCW program (WINMSDSP) that some of us have been using. You do not have to be able to copy CW to use WSJT. Refinements are coming and this will be a very good program. It is being used in the United States and in Europe. There was some hesitation at first on the part of the Europeans, but they seem to have embraced it from what I have heard and seen on the internet.

"I have a Kachina 505DSP for the 28 MHz IF receiver. I use Down East Micro transverters on 6 m, 2 m, and 70 cm. I use a Mirage A1015G brick at 110 watts into an M2 6M7JHV at 65 ft. with elevation for 6 m. I use a DEM kit amp with a pair of 4CX400A at 600 watts into an M2 2M8WL at 65 ft. with elevation for 2 m. I use a modified AM6155 at 300 W into 4 M^2 432-13WL at 65 ft. with elevation for 70 cm. I have not yet made an WSJT MS contact on 70 cm."

From **Walt Miller, AJ6T**: "AJ6T operated portable in CM87 from a site overlooking Silicon Valley in an effort to find a low-angle horizon to make some DX contacts on WSJT. My 2 m setup in the jeep was 200 W and a 10-ele Yagi, with AC power from a new Honda generator.

"Unfortunately, the WSJT activity out here on the west coast is still pretty low, but I did manage nice QSOs with AA7A in Arizona and KF7CN in Washington (new grid, DN16), and a partial QSO with VE7BBG. Some of the warbled FSK burns from Ned were especially loud, but my impression was that the meteor shower was sub par for the *Perseids*.

"I had many useful decodes on my computer screen from pings only 20-60 milliseconds long. WSJT is a terrific mode that has really given meteor scatter operation a shot in the arm."

From **David Anderson, GM4JJJ**: "I had great fun in the shower here. Plenty of activity on WSJT and actually a lot less on SSB because of it. Some complaints:

"Best DX for me was IC8FAX at 2149 km last night. I now have worked 37 stations on FSK441.

"The forecast chaos with the band plan has not come about. WSJT is up around 144.370 with HSMS around 144.100–150. Most MS SSB around 144.200."

From **Goran Andric, S55OO**: "During the *Perseids* there was big activity with new/great WSJT SW. It seems that WSJT will become widely used and we need random QRG!

"So any suggestions what frequency we should name as WSJT random because now was very big activity but everyone was using his own QRG!"

From **Peter Frenning, OZ1PIF**: "WSJT came heaven-sent for me. I'm not, and will never be, a CW fan, and frankly random SSB during showers are a pain, everybody shouting within the same 5 kHz. With the advent of WSJT it has really become possible to work HSMS not only in skeds but also random. Thank you so very much, K1JT!

"A comment about the cluster rampage: Yes I do think that a lot of abuse took place, including some QSOs being conducted fully or partially, but mostly I think it was all in the spirit of 'can this really be happening,' and arranging last-minute skeds and announcing CQ frequencies. A lot of it will have sorted itself out by next time—I think and hope.

"Anyway, apart from a few skeds either broken or incomplete—RU1AA in KO68, two times with EA6VQ and a couple of DO stations running too little power— for me the entire period has been very succesful, and you have certainly gained (no pun intended) another MS aficionado in OZ1PIF. Of the 33 QSOs, 9 were new DXCCs in the 144 MHz log and some 20+ new squares.

"Working conditions: using a single 9-ele. OZ5HF long Yagi (boom 4,7 m, 12 dB gain) @ 15 m AGL (56 m ASL); TX-cable 1/2 inch hardline, RX-cable RG-213 (30 m); Rx FT-847 and mast-mounted MGF1303 (DJ9BV design, 0.3dB NF); Tx: FT-847 +GI7b PA 350 W PEP."

From **Colin Wright, K4SSO**: I did a little high-speed CW (HSCW) via meteor scatter (MS) about two years ago, but found it difficult, cumbersome, and somewhat daunting for the novice user to pick up. I made a couple of contacts (one of which was my personal DX best on 2 m—with K9KNW, in EL95dx, at 1636 km—until this morning), but dropped off the mode.

"Along came Joe's WSJT software. I had heard about it on one of the MS e-mail reflectors, and with the *Perseids* looming in a few weeks, I thought I would check it out.

"Joe, K1JT, had a nice page with very good instructions on how to download the code and get it set up. I downloaded it, hooked up my new RigBlaster to my new TS-2000X, and starting trying it out. The first day I had it running I made six QSOs, five on 2 m and one on 6 m. Five of those were new grids for me. Needless to say, WSJT had my attention!

"The big difference to me between HSCW and WSJT is the speed with which the QSO can be made. It wasn't unusual for an HSCW sked to go better than an hour. With WSJT, it is not uncommon to have a successful QSO in the log inside 15 min. I've had some that ran only a few minutes—of course there were plenty of rocks flying to help with that! I believe that this will enhance the likelihood of more MS QSOs in otherwise slow VHF contests, and probably help bring scores higher.

"Over the three weeks or so I've been using WSJT, I've made 26 QSOs, primarily on 2 m with a few on 6 m to fill in some holes on my grid map. Many of those were in new grids, many in new states, and this morning I increased my personal best on 2 m with VE5LY in DO70qk, at about 1712 km from EM48sr. I've also used it on short paths on 6 m, where conditions weren't particularly good. The WSJT software was able to treat the signals floating up out of the noise on tropo like weak bursts, and decode them correctly.

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Attach the FVS-50 to the PRM-T heavy duty adjustable mobile mount. 16 feet 9 inches total length with 18 inches of RG-188 type coax for easy entry into the vehicle without causing wind noise, water leaks or coax damage. PL-259 barrel is detachable for easy installation, weather cap included.

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Conn: PL-259 or NMO
Ground Independent

SHG-1500B/SHG-1500BNMO
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Gain: 4.5/7.5dBi Length: 59 inches
Max Power: 200W Conn: PL-259 or NMO
Ground Independent

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News *(from page 4)*

CW, voice, data, image, and RTTY, at full amateur power. Hams would have to accept interference from current occupants of the band and avoid causing interference to them, as is now the case on 30 meters, a CW/digital-only band. The ARRL has operated an experimental station on the band—WA2XSY—since 1999, and said that operation has shown that hams can coexist with existing users and " that the band is very suitable for US-to-Caribbean paths," an interesting observation in light of the petition's call for the band to be for domestic use only. Comments on the proposal may be filed online via the FCC's Electronic Comment Filing System (ECFS), accessible on the internet at <http://www.fcc.gov/e-file/ecfs.html>. Comments should make reference to RM-10209. We recommend reading the full text of the petition (also available on the FCC and ARRL websites) before filing comments.

NCVEC: Amateur Radio License Numbers Rising

Restructuring has turned around the decline in amateur radio growth, according to a report delivered to the National Council of Volunteer Examiner Coordinators (NCVEC) at its annual meeting in late July. According to the *ARRL Letter*, R. C. Smith of the Greater Los Angeles VEC told the group that "(t)he prospects for future growth, although more modest than earlier anticipated, are greatly improved."

The group also discussed ways of improving VE team availability in remote areas, problems with test irregularities in Puerto Rico (including a new FCC requirement that it must clear any new Volunteer Examiner appointments there), and a reuest for greater involvement by the amateur community in providing input to the Question Pool Committee on its periodic update of amateur exams.

FCC Investigates Georgia Test Session

Citing apparent "alarming discrepancies in testing procedures," the FCC has begun an investigation of a license exam session held May 19, 2001, in Statesboro, Georgia. In letters sent to the eleven Volunteer Examiners on record as participating in the session, the FCC said it appeared that exams given at this session were identical to those used at several recent test sessions, and that test candidates were able to see the answer key to the Morse code exam. FCC Special Counsel Riley Hollingsworth, K4ZDH, asked the examiners to provide detailed answers to several questions. All eleven VEs have been suspended by the ARRL/ VEC (which called the session to the FCC's attention) until the investigation is complete.

In other FCC enforcement actions, a ham in California accused of causing deliberate interference with simplex communications on 2 meters agreed to a two-year license suspension rather than face possible fines; the FCC reaffirmed its rule that non-coordinated repeaters bear full responsibility for resolving interference problems with coordinated repeaters; a trucking company in North Carolina was cited for operating without a license in the 10 meter band; five hunters in West Virginia were warned to stop unlicensed use of amateur frequencies; a Technician Class licensee received a second warning to stay off of 20 meters; and two family members in Pasadena, California, were asked to justify the 20 club callsigns they each hold.

ARRL Dumps 160 Meter DX Window

The ARRL Board of Directors approved a new band plan for 160 meters at its meeting in July. According to a League bulletin, the new plan sets aside 10 kHz at the bottom of the band for digital modes, recommends a lower limit of 1843 kHz for SSB operation (with CW operation okay on the entire band), and designates two QRP (low-power) calling frequencies, 1810 kHz for CW and 1910 kHz for SSB. In addition, the Board eliminated the "DX window" between 1830 and 1850 kHz, saying it wasn't working, but it suggested that contest sponsors "consider the use of DX windows as necessary." The 160 meter band has no FCC-imposed subbands, so adherence to this or any band plan is voluntary.

In other operating-related matters at the ARRL Board meeting, the directors approved a new QRP DXCC award, approved the concept of online QSL credit for its awards (see this month's DX column on page 96) and voted to open participation in ARRL Field Day to amateurs throughout the Americas. Previously, only stations in the U.S. and Canada could compete.

South Africa to Ease Code Speed

South Africa is preparing to lower its top code exam speed to 5 words per minute and establish a new "learner's license," according to *Newsline*. Once the new rules gain final approval, there will be only one full HF license instead of the current two.

Additional and updated news is available on the Ham Radio News page of the CQ website at <http://www.cq-amateur-radio.com>. For breaking news stories, plus info on additional items of interest, sign up for CQ's free online newsletter service. Just click on "CQ Newsletter" on the home page of our website.

"While it's not quite like 'shooting fish in a barrel,' WSJT really does simplify the effort needed to make contact beyond the line of sight on 2 m using meteors or marginal conditions, and significantly beyond the daily normal communications range. I expect that we'll all see some efforts on 222 and 432 in the near future."

From **Charles Coughlan, EI5FK** (IO51rt): "All of my contacts were made with a 19-ele Met and an FT-847; 50 watts as my amplifier is QRT. It was not a great meteor shower but interesting. Like a lot of amateurs I got a bit carried away with WSJT and was not impressed with the 'experts' making disparaging comments about that mode. I like WINMSDSP 2000 but am always interested in experimenting with new modes. However, I was surprised at a few people completing QSOs on the cluster or on dx-telnet."

Mid Atlantic States VHF Conference

The 25th Mid Atlantic States VHF Conference, sponsored by the Mt. Airy VHF Radio Club, will be held on Saturday, October 13 at the Radisson, North East Hotel, 2400 Old Lincoln Hwy. and US Rt. 1, Trevose, Pennsylvania (for hotel reservations call 215-638-8300; deadline for block room rate is September 21, and mention Block Code "Pack Rats"). Up-to-date information on the conference and Hamarama can be found at the Packrat web page: <http://www.ij.net/ packrats/Hamrama%202001/Hama_01.html#Anchor-35593>. For more info regarding tickets, contact John Sortor, KB3XG, 610-505-6940; e-mail: <JohnKB3XG@aol.com>; web: <www.ij.net/packrats>.

DXpedition to Ghana

The following is from Dick Hanson, K5AND: "Arliss, W7XU, Ed, WØSD, and I will be operating from Ghana, West Africa from Friday, October 26 until Sunday night, November 4. We will be in the city of Elmina, about 100 km southwest of Accra. This is a coastal (beach) location, so that should help. Grid square is IJ95.

"We will be taking two FT-100D's, a 3CX800 amp, a 7-element 27 ft. antenna, and a 25 ft. rotating mast. We will also have HF equipment (100 watts) for 28885 and 14345 MHz. Of course, we will have a beacon-mode keyer, etc."

Current Contests

2001 Fall VHF/UHF Sprint: The following is from the Southeast VHF Society's URL, <www.svhfs.org>:

Object: To work as many amateur stations in as many 2 × 1 degree grid squares as possible, using authorized amateur frequencies on the 50, 144, 222, 432 MHz, and Microwave (902 MHz and above) bands during the contest periods.

Contest Periods 2001:

144 MHz Sprint: 7–11 PM local time, Monday, September 17.

222 MHz Sprint: 7–11 PM local time, Tuesday, September 25.

432 MHz Sprint: 7–11 PM local time, Wednesday, October 3.

Microwave (902 MHz &d above) Sprint: 6 AM to 1 PM local time, Saturday, October 13. Choose any 5 hours, in one-hour increments, to operate, and clearly indicate in log which hours were operated. The Microwave Sprint is one Sprint and certificates will be awarded for highest total score (i.e., total number of contacts on all bands 902 and above, times total of all multipliers, recounted separately on each band).

50 MHz Sprint: 1200–1900Z, Saturda, October 20. Choose any 5 hours, in one-hour increments, to operate and clearly indicate in log which hours were operated.

Exchange: Grid-square locator. Signal report optional.

Scoring:

QSO Points: One point for each complete QSO.

Multiplier: The total number of grid squares worked. Each 2 × 1 degree grid square worked counts as one multiplier.

Final Score: Multiply QSO points by multipliers. Each sprint is scored separately.

Rovers score in accordance with original rover rules—i.e., multipliers begin again in each new grid activated.

Reporting: Logs must be submitted no later than four weeks after the closing date of the each event. Only submitted logs are eligible for awards. Logs must be in ARRL format (log sheets and summary sheet as used for ARRL VHF contests) to be accepted, and must show current address to be eligible for awards. Electronic submissions in ARRL acceptable electronic format may be mailed on diskette or e-mailed with log file as an *attachment* only (not in the body of e-mail). *(Editor's note: Where to send your log was not posted on the URL as of our deadline. I suggest that you contact the Southeast VHF Society's URL Webmaster ,Neal Sulmeyer, <K4EA@contesting.com> for this information.)*

Certificates for top three non-Rover finishers in each sprint and top three Rovers in each sprint if sufficient Rover competition is shown.

Use of telephone, packet, or internet methods to coordinate contacts is acceptable, as long as complete exchange of callsigns and grids is accomplished on the relevant amateur radio band.

ARRL EME Contest: This year's ARRL EME Contest will be on October 13–14, 2001 and November 10–11, 2001. Conditions are forecast to be excellent for the first weekend and good for the second. Complete rules were in last month's *QST* and are posted on the ARRL website at: <http://www.arrl.org/contests/announcements/rules-eme.html>.

Current Meteor Showers

The *Orionids* is predicted to peak around October 21. The exact time was not available at press time. For up-to-date information check the International Meteor Organization's web page at: <http://www.imo.net>. A characteristic of this shower is that it has several smaller peaks both before and after the main spike. The second major peak is expected approximately four days after the main peak. At peak the zenith hourly rate (ZHR, the number of predicted meteors falling per hour) is predicted to be around 20. Look for activity associated with this shower for approximately 16 days beginning a week before the main peak.

And Finally . . .

In late-breaking news just before deadline, on August 18 at 1419 UTC, VE4MA and W5LUA completed the first 24 GHz EME QSO after exchanging M signal reports. Signals were quite good with slightly less than the normal buzz experienced at 10 GHz. Weather at VE4MA was cool and clear, while at W5LUA is was hot, cloudy, and humid. The clouds and the moon's proximity to the sun made optical tracking impossible; thus keeping their antennas pointed at the moon was difficult. VE4MA was using 60 watts at the feed of an offset-fed 8 ft. dish and W5LUA had 80 watts at the feed of this 10 ft. dish.

If you have a contribution to make to this column, please send it to me. Thanks to you, your column continues to report on the latest in our specialty of weak-signal communications on the VHF-Plus ham bands.

Until next month... 73, Joe, N6CL

"This Antenna Works so Good, You Gotta Have One!"

The Efficient "Outbacker® Joey" QRP HF/VHF Portable Antenna System from Alpha Delta Will Really Brighten Up Your QRP Rig and Provide Great Signal Performance! Perfect for Your FT817, 2020, K1/K2 and Similar Rigs.

• Covers complete HF/VHF range from 80 meters through 2 meters, including 30, 17 and 12 meters. Even has separate taps for 80 CW and 75 SSB. Each band hand tuned at Outbacker for peak performance. Rated at 20 watts all modes.

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• The unique design, with its optimum shaft length to stinger ratio and careful band tap placement, puts out an extremely effective signal, even on PSK31. It compares favorably to some other Outbacker models. Shorter shafts used in some other designs can be very inefficient, wasting more of your QRP watts.

• When we say "Antenna System", we really mean it! The **Joey** system comes complete with a durable copper braid counterpoise, and a custom anti-twist 90 degree SO-239 to PL259 adapter for installation on SO-239 UHF connectors. Therefore, the antenna can be installed directly on the FT-817 on its rear SO-239 connector. The **Joey** antenna is terminated in a male PL259 plug for extra strength and durability.

• The antenna has a 30 inch shaft and a 20 inch stinger when fully extended. Weight is just over 1 lb.

Available through Alpha Delta Dealers or direct. Add $5.00 ea. s/h in U.S. Exports quoted

• Model Outbacker Joey QRP HF/VHF Portable Antenna System.....$249.00 each.

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If doing your own mobile installation seems like just too big a job for you, remember you usually have a resource close at hand—your local radio club and fellow hams.

It Took a Village...

BY DENNIS McCARTHY,* AAØA

It took a village to install my HF mobile rig, and a major member of that village is Joe Collins, NØFNF. That's why I went to him when I wanted to go HF mobile.

I decided to put an ICOM 706MKIIG in the car because my wife and I are accumulating grandchildren all over the country. Mary Ann, NØIKL, and I have been married 43 years and have 10 children scattered about. Now they, of course, are having our grandchildren, so we bought a huge highway cruiser (better known as a 1992 Mercury Grand Marquis) to go visit them.

Although Mary Ann is a ham, she will not tolerate wires all over the interior of the car. As a result, after I bought my ICOM 706, I went to Joe. I also got advice from others, including my son, Tom; fellow ham Tom Vogel, WAØKGU; and helpful folks at the hardware store and gas station. Most of the help, however, came from Joe.

Joe is a retired maintenance superintendent. He, like me, has an ICOM 706. Joe took time out from his retirement just this once to help me. He fabricated an under-dash mount made to hold the optional ICOM faceplate. The rest of the rig, according to Joe, had to be mounted in the trunk to keep interior clutter down. He also noted I had a power seat that could "steamroller" a rig placed under there.

My car has a battery with top and side terminals available. I decided to use the unused set of side terminals exclusively for the 12 volt source. I simply could have used bolts and screwed them in, but I used the brass connectors (see photo) instead. I bought them from a vendor at the Dayton Hamvention for $2.50 each.

The black-and-red 12-gauge wire is available from Home Depot for about 70 cents a foot, and I had the in-line fuses. Because the rig was 20 feet away in the trunk, I figured the heavier the better. I also got the longer (16.4 ft. OPC-587) Icom separation cable.

My son, Tom, figured it was easier to remove the rear seat back altogether than to try to snake the cables through. He was right. I had spent forever trying to fish them through, but it actually took only 15 minutes Tom's way.

For cosmetic purposes I opted for the Lakeview** Ham Sticks with quick disconnects to be mounted between the trunk lid and the fender. At first I had a problem getting the nut behind the fender lip and holding it there while the screw was threaded. I solved that by putting glazing putty on my fingertip and putting the putty behind the lip. However, I could not get a lock washer on, and after 100 miles or so with a

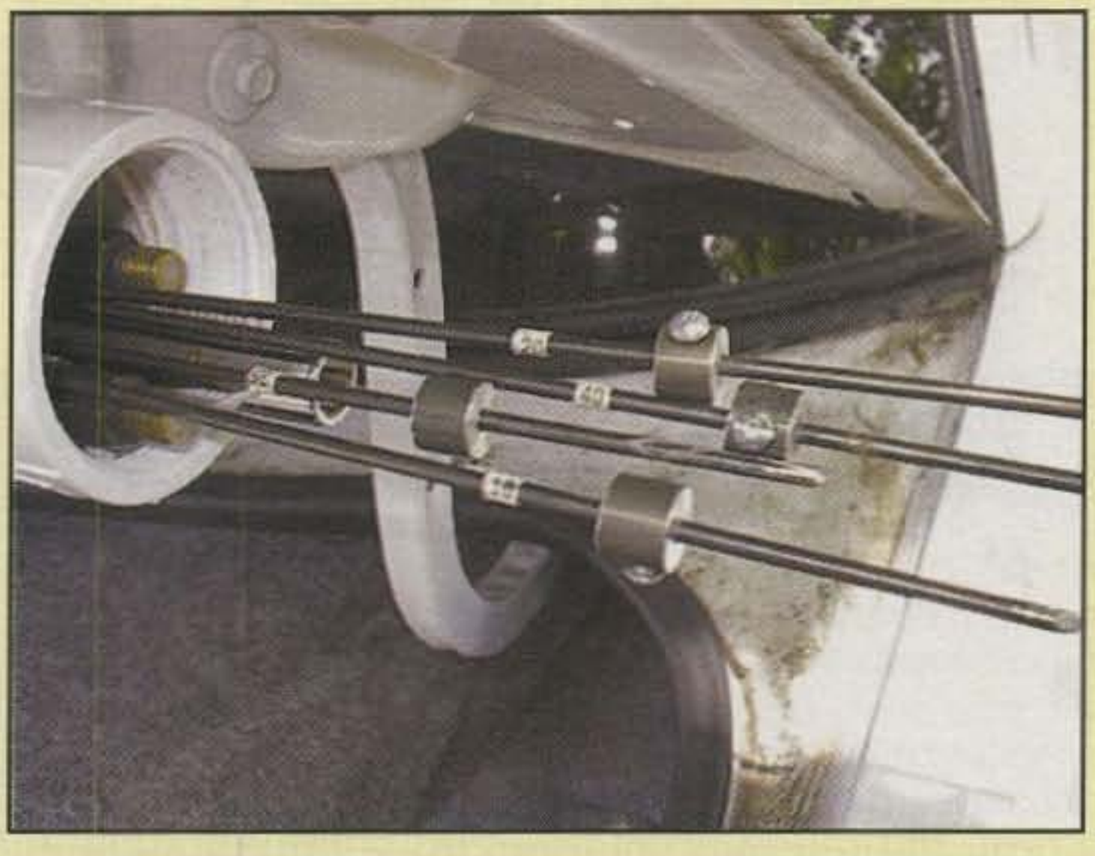
Joe Collins, NØFNF, checking antennas and whips (stingers) in the PVC tube which is held by a bungee cord to the trunk lid of the author's 1992 Mercury Marquis. (Photos by the author)

The RadioShack magnet holding thumbscrews and Allen wrenches for the antenna whips stored in PVC pipe. Note the whip lengths marked on the pipe.

e-mail: <McCartdj@slu.edu>

***Lakeview Company, Inc., 3620-9A Whitehall Road, Anderson, SC 29626 (864-226-6990; e-mail: <hamstick@hamstick.com>)*

The body of the ICOM 706 MarkIIG "Velcroed" to the carpeting in the trunk. It can be placed anywhere, no drilling or holes and it holds tight. The removable control head is up front.



Antenna whips with marking "collars" attached (see text for explanation). Also note each whip is marked for its correct band to avoid confusion.

whip swaying, the mount became loose. Joe came up with another solution: He used 1/4 inch stainless hardware instead of the 10-32 nuts and bolts that came with the mount. He also used self-locking nuts with nylon inserts. I also added stainless lock washers to the quick-disconnect base.

When I was tuning one of my Ham Sticks, one of the tiny screws fell out. My local hardware store clerk said I should change to socket-head set (Allen) screws to make it easier to start the screws and to help prevent losing them. Size 8-32 (size 8, 32 threads to the inch) screws were required. Joe suggested I use one Allen screw and one thumbscrew. The idea is to use the Allen screw to barely hold the whip and the thumbscrew to tighten it down to keep the stinger from coming out.

Joe also manufactured collars for the whips to keep them from slipping down into the Ham Stick and to have a permanent marking place so the antenna will always be pre-set for the proper frequency. The collars can be purchased ready made from Bearing Headquarters (see <Bearing headquarters.com>).

Just in case the collars come loose, the lengths of the whips are written on the PVC tube I made (under Joe's direction). Joe also suggested that I could use different colored heat-shrink tubing to match the stingers to the Ham Sticks. Also, belt and suspenders type of guy that I am, I laid a yardstick on the tube and marked various measurements onto it.

The tube is 2 inches in diameter. I glued on a bottom cap and put a screw-on cap on the top. The pipe is 50 inches long and holds five Ham Sticks. All the parts were bought from Home Depot for less than $10. In fact, there was plenty of PVC tubing left for a second antenna container. The pipe comes in 10 foot sections. I asked a clerk to cut the pipe so it would fit in my car, but instead of cutting it in half, I had it cut at the 50 inch mark.

Home Depot also carries adjustable bungee cords. I picked up two 30 inch cords for less than $3.50 to mount the tube to the trunk lid. I also bought a $1.00 magnet from Radio Shack and have it stuck to the inside of the trunk lid to hold the Allen wrench and the thumb screw.

The antenna was mounted on the left side of the car to avoid low-hanging branches while driving in the city. The tube was mounted with the opening on the passenger side to permit antenna removal from the curb side of the car, thus minimizing the time spent on the street (get hit) side of the auto.

I have an under-dash bracket for my IC-706. I was planning to drill a couple of holes in my car trunk bottom to attach the bracket and was stopped just in time by Tom Vogel, WAØKGU. Tom is a professional radio installer. He told of some installers accidentally drilling into auto gas tanks. My tank is against the part of my trunk bottom where I was going to mount the 706. The idea of drilling and screws disappeared instantly when I envisioned a ball of fire.

Tom had a better idea—Velcro®. I put a couple of pieces on the bracket and put the rig on the carpeted shelf in the trunk. It doesn't move anywhere.

Next Joe (remember Joe?) made a special socket for the FT-243 crystal holder and mounted it at the base of the antenna. Then he took out the crystals in two holders and installed capacitors in each one to create a matching impedance for the 40 and 75 meter Ham Sticks to permit wider band coverage. He first temporarily installed a variable capacitor to tune each antenna, measured the capacitance, then installed the closest disk capacitor he had. The values are roughly 220 picofarads for 40 meters and 500 picofarads for 75.

Finally, Joe used an old pouch to hold two 4 inch adjustable wrenches to tighten and loosen the quick-disconnect hardware (and now I do, too!). A cap is also included to cover the SO-239 connector for the 2 meter antenna when going to the car wash. Of course, you could use two old pliers in place of the wrenches.

Another friend, "Murphy," helped me pack for a recent trip to Minneapolis. I forgot both the wrenches and the pliers and had to get help at a service station to loosen and change antennas. On the other hand, once I changed from 20 to 15 meters, I started working DX, including a JE4 (Japan), an SP (Poland), and an SM (Sweden). All this, thanks to help from the ham village. ■

World Of Ideas

BY DAVE INGRAM, K4TWJ

A Look At The World Around Us

Romantic Retros and Dinkin' Delights—Part I

Oh, those beautiful little heart-throbs from the dear old days and tender times of yesteryear—their warmth, their romance, their incredible personality! As you have probably surmised, I am referring to those lovable little vacuum-tube rigs from eras past. Yes, and are they ever delightful to build and use on today's HF bands. Now this is hamming at its golden best, and you need not be an old-timer to enjoy using vintage gear. In fact, many newer hams are having a ball operating old-style tube gear, and they are also proof that the operator rather than the rig makes the difference. Looking for real radio thrills and excitement? Fire up the soldering iron and get ready for some cool, quick-brew projects. The fun starts right here and right now!

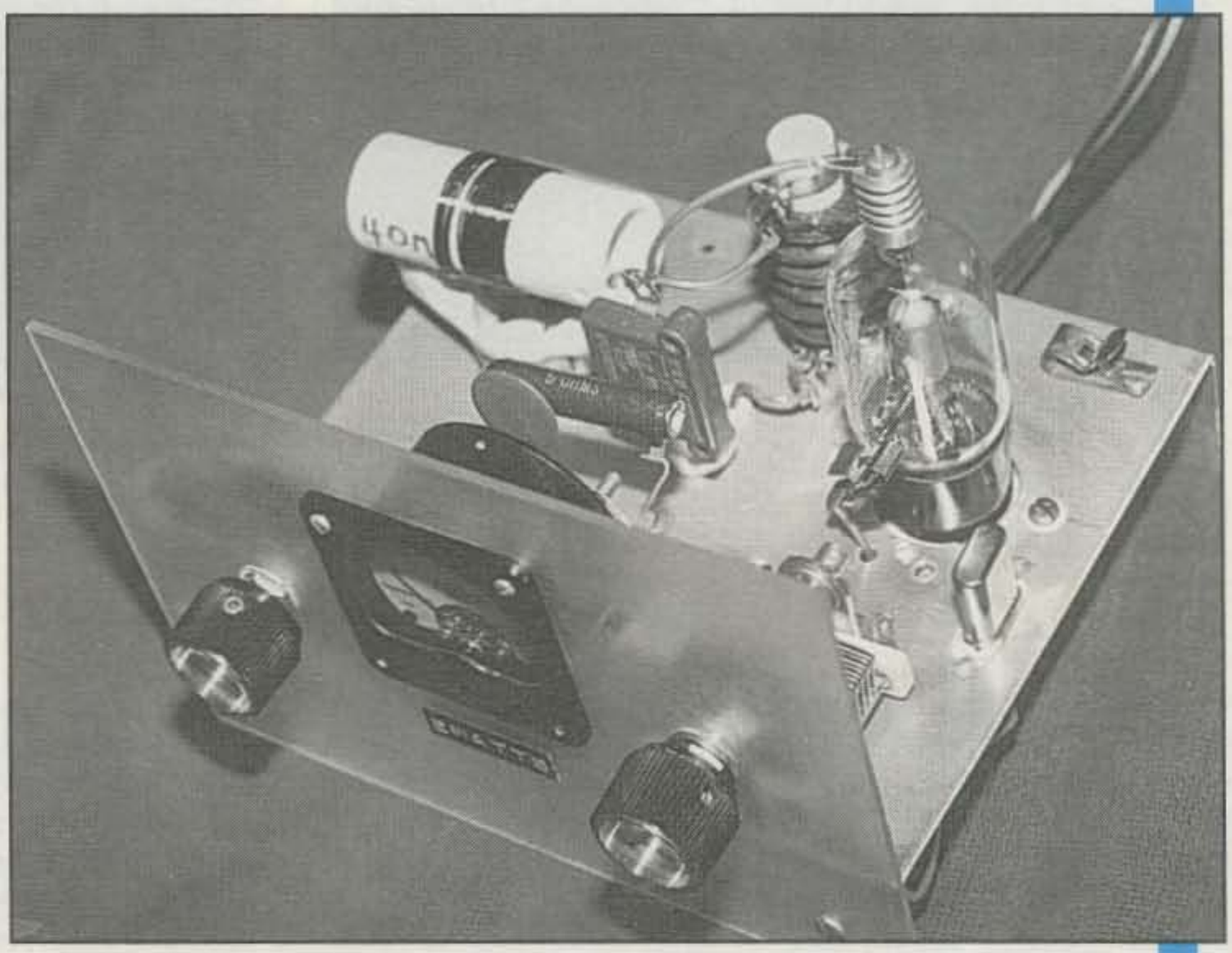


Photo A– The Remarkable Retro built by John Risch, WØFEV. The rig is constructed on an aluminum chassis approximately 2"H × 9"W × 8"D, has a semi-transparent Plexiglas™ front panel, and uses a classic 3C24 tube. (Photo via WØFEV)

Remarkable Retro

A few months ago John Risch, WØFEV, of Florissant, Missouri sent me a photograph of a neat little 1940s-style trans-

4941 Scenic View Drive, Birmingham, AL 35210
e-mail: <k4twj@cq-amateur-radio.com>

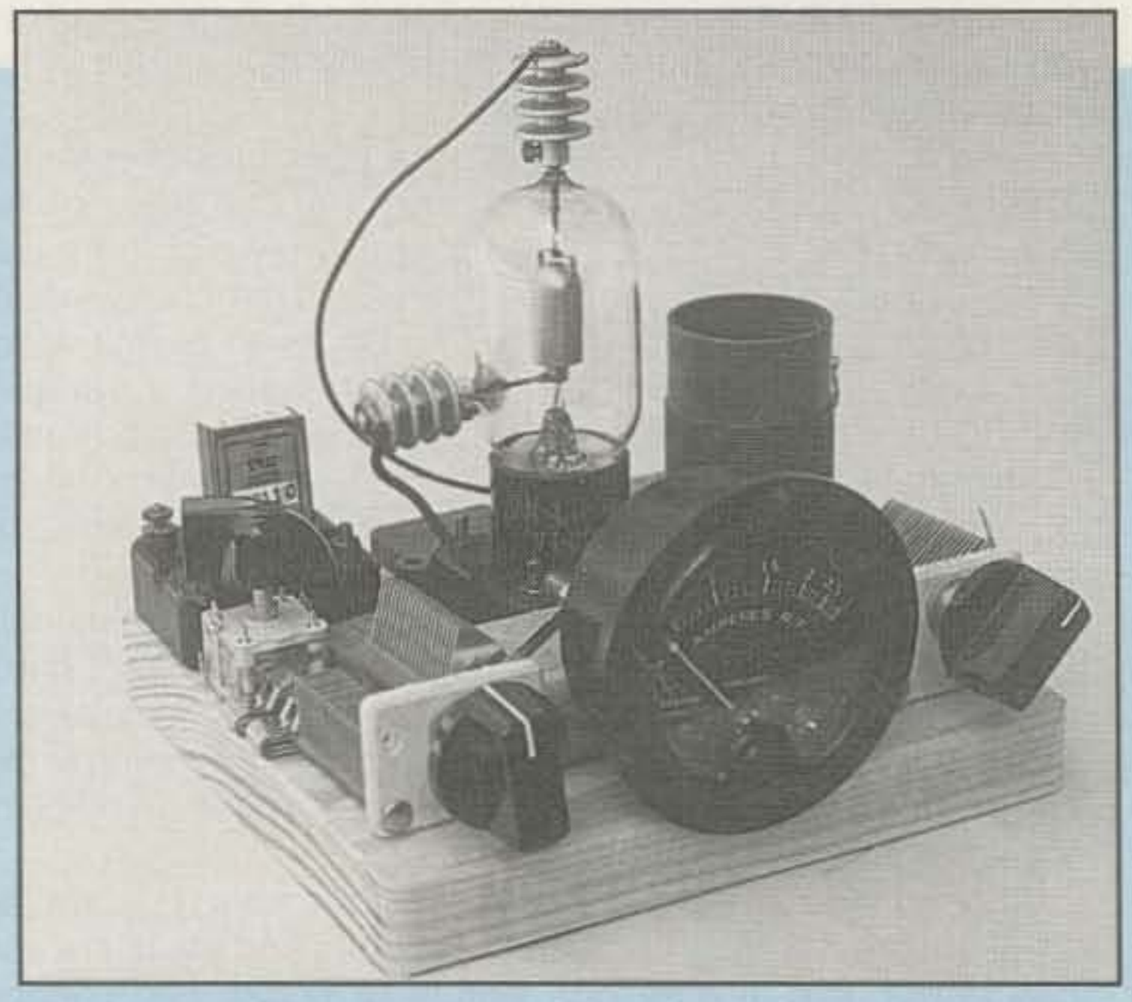


Photo B– My quick-brew version of the 3C24 Remarkable Retro rig is built on a slightly too small pine board measuring 1" × 6" × 6". General layout of parts is not overly critical and may be varied slightly for artistic beauty.

Photo C– The intriguing little 3C24 tube features pins on the side and on top as well as in the base. This tube is a genuine "rarie." Take good care of it.

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Size: 10$^{1/2"}$ Wide x 7$^{1/2"}$ Deep x 3$^{3/8"}$ High

Frequency Coverage: 29.000-54.000 MHz., 108.000-174 MHz., 216.000-512.000 MHz., 806.000-823.995 MHz., 849.0125-868.995 MHz., 894.0125-956.000 MHz.

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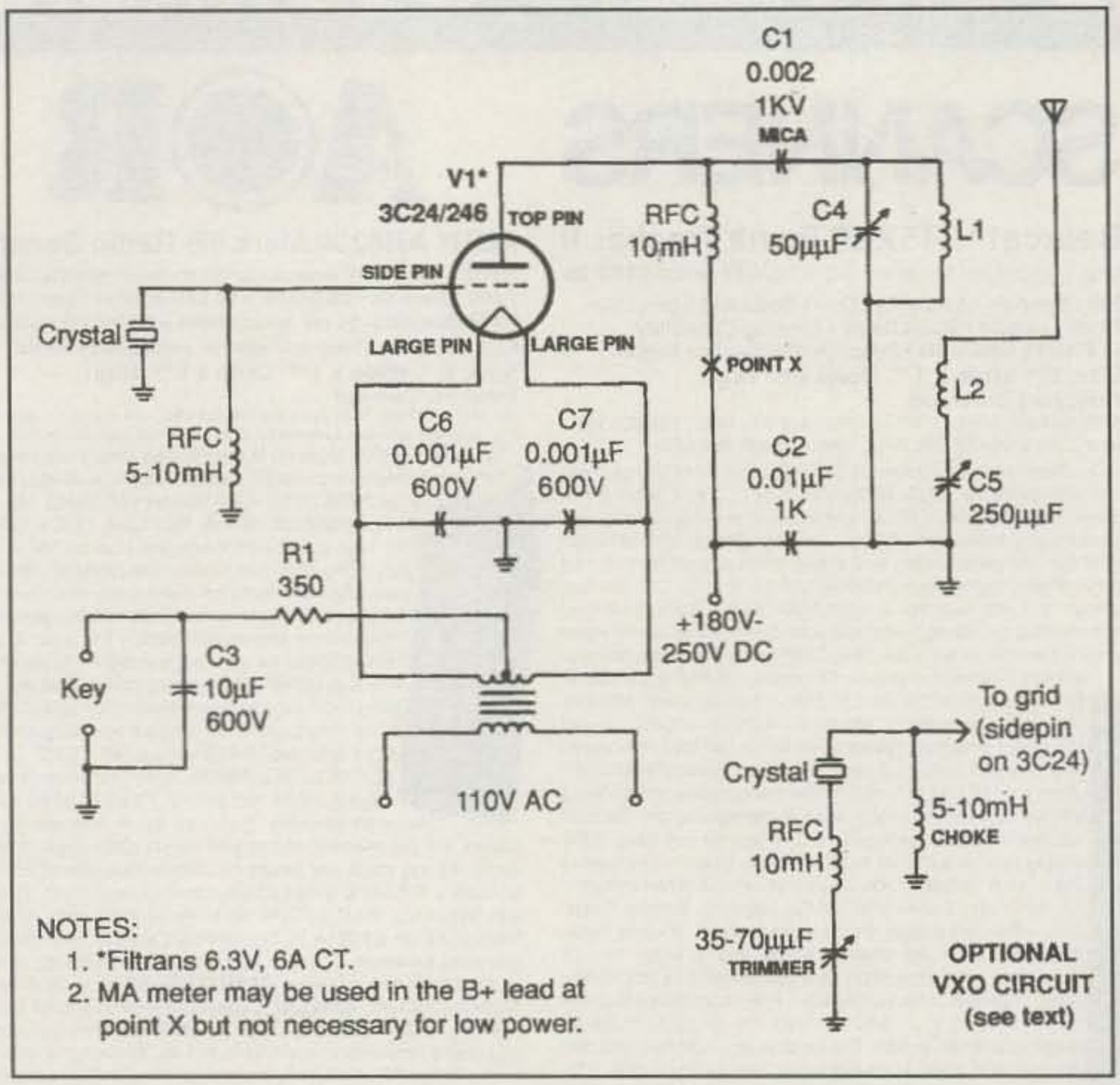

Fig. 1– Circuit diagram of the 3C24 Remarkable Retro transmitter. Tube is capable of delivering up to 30 watts output, but I recommend holding it to 5 or 6 watts for best sound and longest life. Optional VXO circuit can be added after smooth operation without it is confirmed.

mitter he homebrewed, and it captured my heart at first glance (photo A). I immediately asked John for a copy of the transmitter's circuit diagram and started building my own version of the Remarkable Retro (photo B). Then we took a closer look at the tube's internal structure (photo C) and realized many of our friends would also like to assemble their own version of this 3C24/24G delight. Just look at that rich, round plate, that mesh grid, and that hefty 6.3 volt/3 amp filament. Now answer honestly: Who could resist falling in love with such a magnificent little RF power tube?

This transmitter's circuit is no slouch either (fig. 1). It is a triode crystal oscillator with filament center-tap keying, a shunt-fed tank circuit, and a variable capacitor on the output link so it tunes like a regular Pi-net circuit (load, dip, load, dip). Triode oscillators tend to draw more grid current than more common multi-grid oscillator tubes such as 6AG7s or 6L6s, and high grid current can fracture modern tin-can (wimp) crystals. Here we sidestep that entanglement by first using larger/old-style FT-243-type crystals (available from Jan Crystals, 1-800-JAN-XTAL) and then by applying no more than 250 volts to the tube's plate. Output power will be 5 or 6 watts tops, plenty of power for good CW QSOs. If you like to measure input power or desire a tuning aid, incidentally, insert a 0 to 50 or 100 ma meter in series with the high voltage and the RF choke (point X on the diagram). Typically, it will read around 20 or 30 ma when the little transmitter is fully loaded/ tuned. If you check the technical data on a 3C24, you will note it is capable of handling up to 1000 volts and delivering 30 watts output. Operating it at reduced potential, however, ensures crystal safety and longest possible tube life. Remember we are using a genuine "rarie" here, not a mass-produced tube such as a 6L6. Treat it tenderly.

John wound his tank coil for this transmitter on a 1 inch diameter plastic form. I wound mine on a salvaged phenolic 1 inch form. A pill bottle with a wrap of masking tape to produce a non-slip surface is another good coil former. For 40 meters L1 is 14 turns of No. 22 enamel-coated copper wire close wound on that 1 inch form, and L2 is 5 turns of the same wire close wound and spaced 1/8 inch from the bottom of L1. For 30 meters L1 is 11 turns and L2 is 4 turns of the same wire. For 20 meters L1 is 8 turns and L2 is 3 turns of again the same close-wound No. 22 wire with L2 spaced 1/8 inch from L1. I have not tried 80 or 160 meter operation, but would estimate that 28 and 56 turns respectively for L1 and 10 and 20 turns respectively for L2 with C4 and C5 increased to 350 pFd each should work fine. Remember to use same-band crystals; do not attempt frequency doubling with this little tyke.

A small power supply such as that used with an older tube-type radio or PA system and capable of producing between 180 and 250 volts with *good voltage regulation* makes a nice plate supply for the 3C24. A separate 6.3 volt transformer capable of comfortably delivering 3 amps *continuous duty* is recommended for filament voltage. Can't find suitable power transformers? Use two 115 volt to 115 volt isolation transformers with their primary windings wired in parallel and their secondary windings wired in series as illustrated in fig. 2. Add a third transformer for the filament, and you are ready for big-league radio at its best.

Tune-up and operation of the Remarkable Retro is a snap. Just apply filament voltage and let the tube warm up a few minutes before transmitting. Then close the key and quickly tune plate capacitor C4 for minimum plate current or maximum output (as read on an in-line wattmeter). Let the tube rest a minute, then increase loading capacitor C5 from its minimum/fully-meshed position, close the key again, and tweak-tune C4 for maximum output. After loading the transmitter to near full output, listen to its CW note on a good communications-grade receiver. Tweak C4 (and possibly decrease C5) as necessary to produce the best sounding note, then enjoy! Running this vintage transmitter is more fun than driving a classic car—and much less expensive!

The Knight "DX-er"

A number of readers have urged me to include an easy-brew receiver to mate with simple vintage transmitters featured in this column. I did some heavy-duty digging and uncovered the little marvel shown in figs. 3 and 4. This par-

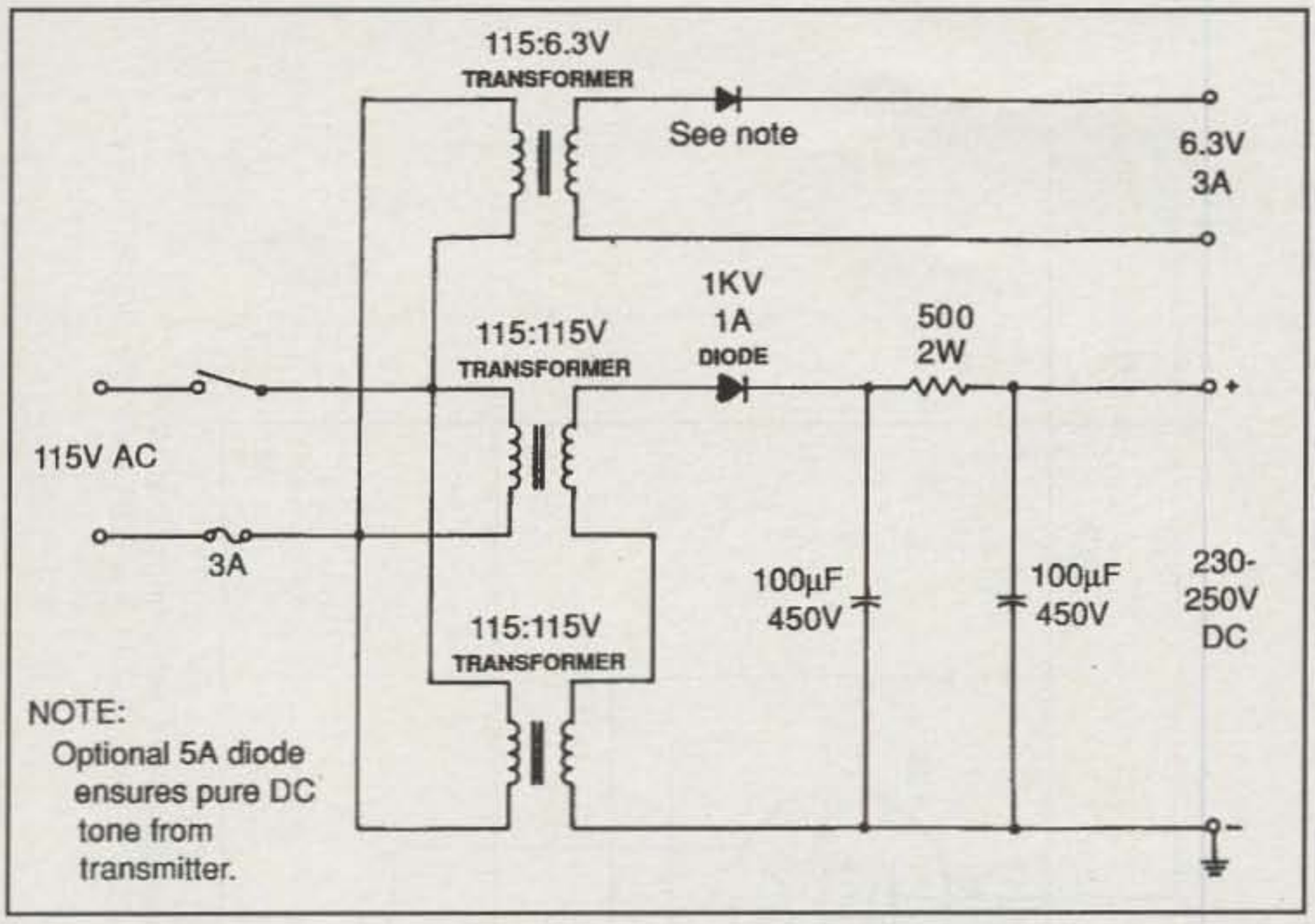

Fig. 2– Suggestion for an "alternative power supply" made from a 6 volt/3 amp transformer and two 115-to-115 volt isolation transformers. (Discussion in text.)

ticular item was offered by Allied Radio Corporation of Chicago during the 1950s and was one of the famous "low end" Knight Kit receivers. It is a battery-powered job called the "DX-er" and utilizes four plug-in coils to cover the approximate range of 530 kHz to 18 MHz.

The DX-er users a pair of miniature 1S5 tubes to achieve good sensitivity and long battery life (up to 300 hours, perfect for field day or farm use). One tube serves as a regenerative detector and the other tube functions as an audio amplifier. R-C coupling is utilized between the two stages to "keep things simple" and minimize cost. Indeed, Allied sold this little shortwave radio kit for only $11.75 plus $1.65 for a pair of 2000 ohm earphones and $2.45 for a matching set of plug-in coils. What a bargain! Many other regenerative receivers used 700 Henry audio couplers, items that were quite expensive back then and are as scarce as hen's teeth today. By comparison, a 47K ohm resistor, a 10 megohm resistor, and a .01 mFd capacitor work almost as well and make the DX-er easy to reproduce today. That is always the foremost consideration when selecting old-time gear featured in this column: All parts should be fairly easy to obtain today.

Other parts that warrant consideration include the 2000 ohm earphones, the batteries, and the plug-in coils. An original Knight Kit prepunched chassis and prelabeled front panel are impossible to find; you will have to home-fabricate those two items, and the only guide is my "sketch from a poor sketch" (fig. 5). I am sure your handiwork will reign supreme, however, and I will even hold space in a future column to highlight a picture of your DX-er repro!

Remember this receiver's earphones serve as the audio amplifier tube's plate load. Use older 2K ohm to 5K ohm types, and do not add a 2K-to-8-ohm transformer. It is too lossy. The 90 volt "B" can be homebrewed by connecting ten regular 9 volt batteries in series. Creative-minded builders might even home-fabricate a famous old Burgess battery "wrapper" for holding the 9 volt batteries together. A 1.5 volt dry cell or a "D" cell will serve nicely as a filament "A" battery.

The plug-in coils used in this receiver are wound on regular 4-prong forms $1\frac{1}{4}$ inches in diameter and $2\frac{1}{4}$ inches tall. The forms are not getting more plentiful today, but check hamfest flea markets, and sources such as Antique Electronic Supply (6221 S. Maple Ave., Tempe, AZ 85283; telephone 480-820-5411 or <www.tubesandmore.com>) or follow leads in *Antique Radio Classified* (P.O. Box 802-B22, Carlisle, MA 01741; telephone 978-371-0512) and you should find at least two forms to use. As an alternative, consider making your own forms by fitting empty tissue rollers or large-diameter pill bottles onto the (carefully broken off) bases of defective

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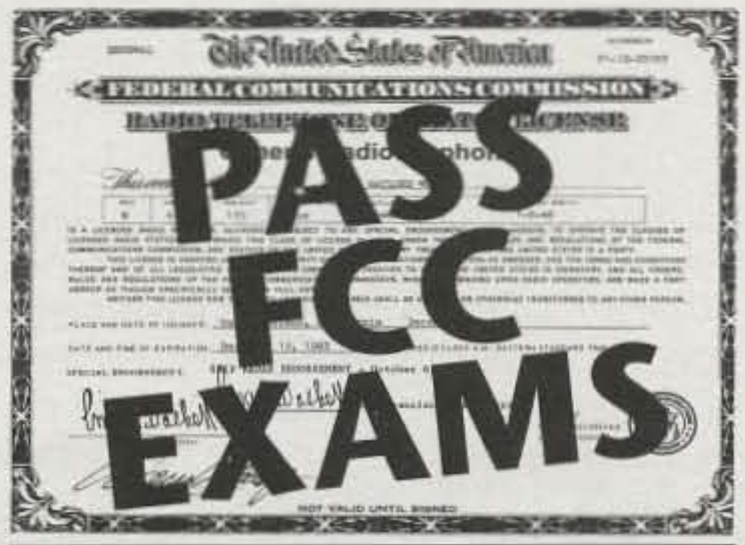

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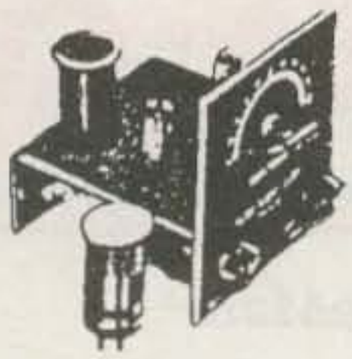

Fig. D – 2-Tube Battery "DX-ER" Kit

Popular, low-cost receiver kit. Uses plug-in coils for coverage of 550 kc to 31.5 mc – broadcast band and shortwave reception. Features low-drain, miniature tubes – battery life exceeds 300 hours! Two tubes: 1S5 regenerative detector and 1S5 amplifier. Controls: main tuning, bandspread, and sensitivity. For headphone use only. With all parts, punched 5x5x2" chassis and 5x5 1/2" panel, tubes, 2 broadcast band coils and instructions. Less batteries (requires two 45v. "B" batteries and one 1 1/2 v. "A" battery), headphones, shortwave coils, wire and solder. Instructions include pictorial and schematics. Wt., 5 lbs.
83 S 309. NET ... 11.75
HEADPHONES, 2000 ohms, Wt., 12 oz.
59 J 110. NET ... 1.67
"B" BATTERY Type M30 (2 required) 45 volts, Shpg wt., each, 2 lbs.
80 J 546. NET EACH ... 1.93
"A" BATTERY, Type 4F, 1 1/2 volts, 1 1/2 lbs.
53 J 003. NET ... 89¢
PLUG-IN COIL SET, Covers 1.3 to 31.5 mc. Shpg. Wt., 2 lbs.
60 H 680. NET ... 2.45

Fig. 3– Original-era Allied Radio ad highlighting the little two-tube "DX-er." Now this is a real shortwave radio!

full-size tubes. Wrap the form with masking tape to achieve the desired 1 1/4 inch diameter and produce a fairly non-slip surface for the winding. Details of primary and secondary windings, wire size, and turns per inch are listed in Table I. The secondary winding should be wound/spaced 1/8 inch below the primary winding.

Operation of the assembled DX-er is a cinch, but you need a well-calibrated second receiver to "reference" its tuning range at first turn on. Variations in coils, substituted "near correct value" tuning capacitors, and stray capacitance in wiring will affect final/overall tuning range.

Start by increasing the regeneration control until a howl is heard in the earphones. That howl tells you the DX-er's detector circuit is working, and it also causes the DX-er to transmit a weak signal you can tune in on a nearby communications-grade (ham) receiver. Use

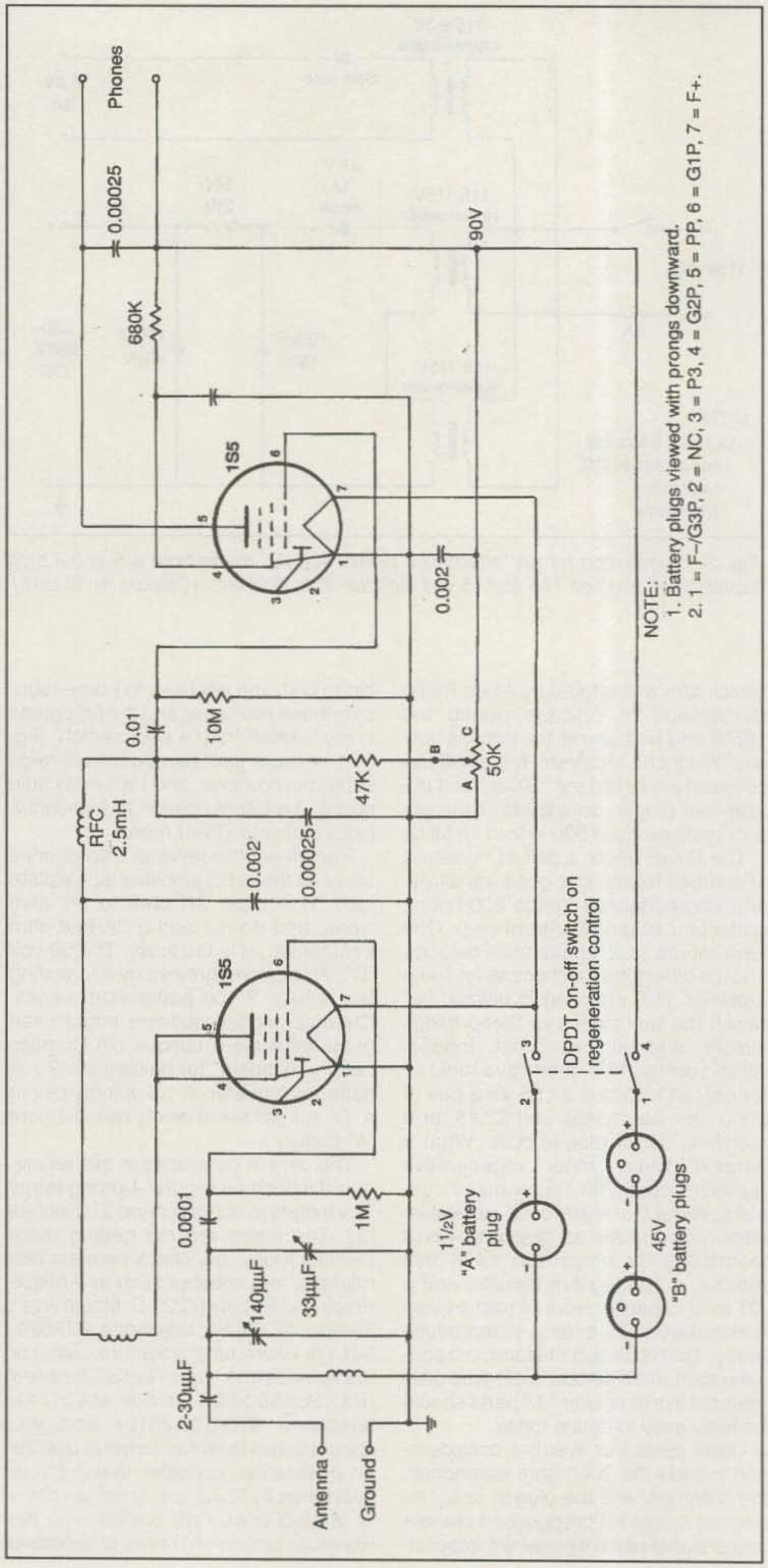

Fig. 4– Circuit diagram of the two-tube DX-er. (Discussion in text.)

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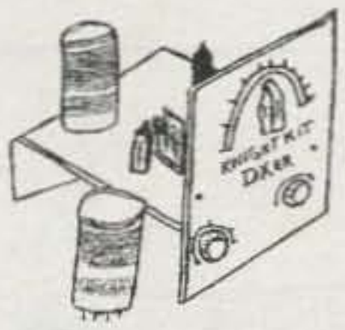

Fig. 5– Sketch of the DX-er's 5"H × 5 1/2" wide aluminum front panel. Judging by other Knight Kits, I would say the bandset capacitor is in the middle and the bandspread capacitor is on the left side. When building one from scratch, however, I suggest reversing the positions for easier and more comfortable ham-band tuning. My sketch may be poor, but at least it gives you an idea of physical layout.

Freq. Range	Primary Turns	Secondary Turns	Length of Primary Winding	Turns per inch of Primary Winding	Wire Gauge
530–1900 Kc	73 1/4 T	13 1/4 T	1"	74	28
1.65–4.1 Mc	42 3/4 T	7 3/4 T	.9"	47	24
2.9–7.3 Mc	24 3/4 T	3 3/4 T	.9"	28.4	20
7.0–17.8 Mc	8 3/4 T	3 3/4 T	.8"	10.9	20

Table I– Coil data for the two-tube DX-er. (Discussion in text.)

only a 3 or 4 inch length of wire for an antenna on that nearby receiver for spotting of the DX-er's signal. Next, make a frequency chart you can reference to the DX-er's 0, 50, and 100 dial marks so you can estimate its approximate tuning range. Then knowing roughly where you are tuning, connect an outdoor antenna to the DX-er, peak its 5 to 30 pFd antenna trimmer capacitor, and reset the regeneration control right before its "howl point."

Tune in a few CW signals and get the "feel" of using a real radio! You will hear both CW sidebands and plenty of slightly-off-frequency stations simultaneously (a no-tune scanner!), but just tune a desired station for a low tone, concentrate on only that tone, and ignore the rest. Now that's what I mean when I say, "The operator rather than the rig makes the difference!"

So how well does this little receiver work? Need you even ask? Those are genuine 1S5 tubes in there, friends! Just switch it on and stand back while the DX pours in like a tidal wave. This thing is not named the DX-er without justification. It is a rompin' little dude!

Conclusion

That wraps up our views for this time, gang, but stay tuned for more "build 'em" details on more fun rigs in Part II next month. Meanwhile, remember to always exercise extra caution when working with high voltages and tube rigs. Keep your hands clear of live wires, have fun, and listen for my low-power signal on 30 meters most weeknights.

73, Dave, K4TWJ

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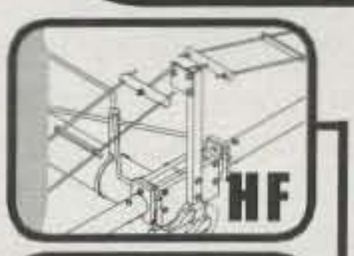

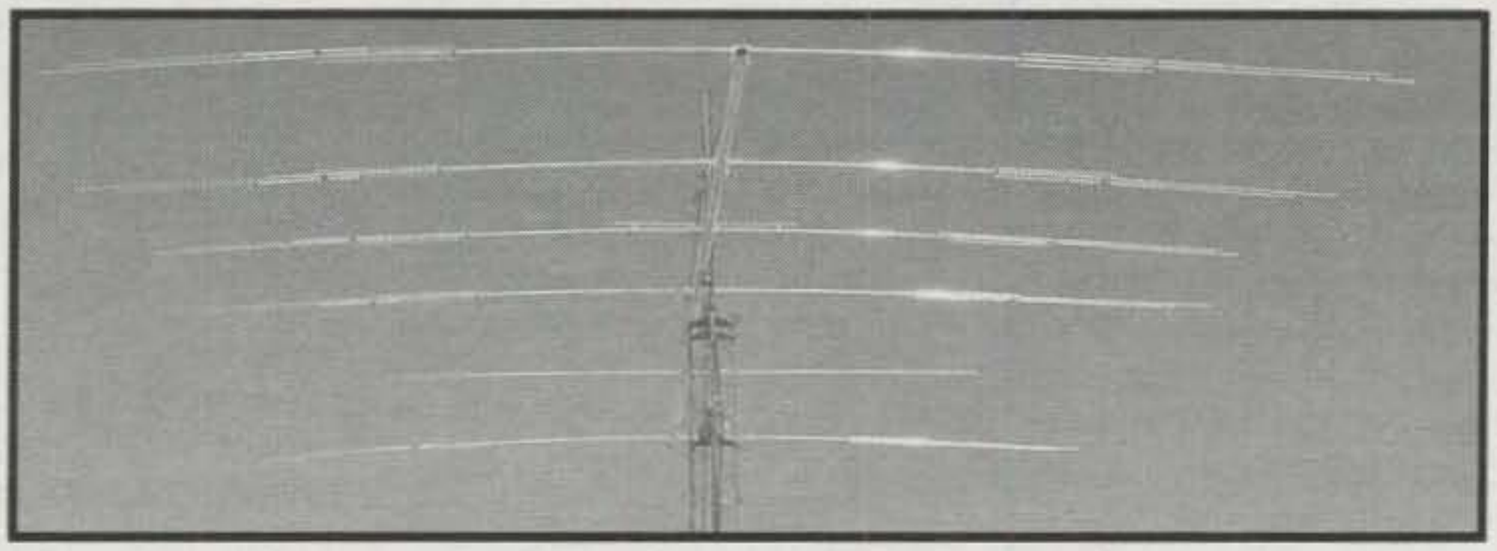

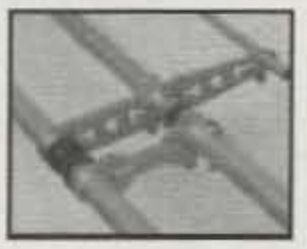

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What's New

BY KARL T. THURBER, JR., W8FX

A New Column for A New Century

Fabulous Fall Goodies

This month in your "What's New" column we'll focus on some fabulous radio gear, hamshack accessories, antennas, portable and mobile gear, software, books, and other goodies and gizmos we think will be of real interest to you. Let's dig right in.

Radio Gear

New AOR TDF-370 Multi-Mode DSP and Digital Terminal. AOR has announced the TDF-370 Multi-Mode DSP and Digital Terminal, or MMT (photo A). It's a device that processes transmitted and received audio and can decode, encode, and display the popular PSK31 and RTTY signals. The new, multi-capable unit, which AOR considers to be a breakthrough in audio technology, can even simulate "stereo" reception from received signals.

According to Takashi "Take" Nakayama, KW6I, vice-president of AOR USA, Inc., the AOR MMT performs nine key functions, making it a sort of "must have" accessory. These functions include received voice audio processing, received CW audio processing, PSK31 and RTTY reception and display, PSK31 and RTTY transmission, microphone equalization, digital voice recording, and SSTV operation (optional software is required). Perhaps the most exciting development in the AOR MMT is its ability to derive "stereo" SSB from received signals. You can adjust the stereo effect to individual tastes; stereo headphones are provided.

When connected to a computer, you can use a simple terminal program to control the AOR MMT's settings and operation. You also can change and retain parameter settings in the non-volatile EEPROM memory. Conveniently, AOR makes available for download from its website free TDF-370 control software.

The AOR MMT is $329.95. For more information, contact AOR U.S.A., Inc., 20655 S. Western Ave., Suite 112, Torrance, CA 90501 (310-787-8615; e-mail: <info@aorusa.com>; web: <http://www.aorusa.com>).

Photo A–AOR's new TDF-370 Multi-Mode DSP and Digital Terminal, or MMT, performs nine key functions, making it a sort of "must have" accessory (see text for details). (Photo via AOR USA website)

Edmund Scientific Catalog and Professional Weather Station. Edmund Scientific has more than 57 years of experience in providing science students, educators, and enthusiasts with everything they need to explore the worlds of physics, chemistry, astronomy, biology, and geology. Its inventory of nearly 5000 different products includes collections of the most comprehensive telescopes, microscopes, magnets, chemistry sets, lab supplies, and science project kits available anywhere.

While perusing the company's website, you can order a very interesting free catalog at the same time. I'm sure that the catalog is put together without much thought to amateur radio specifically, but if you're any kind of "gadget freak," you'll undoubtedly love the kind of equipment offered.

One of Edmund Scientific's more interesting products is the sophisticated Professional Wireless Weather Station, with everything you need for complete weather monitoring and forecasting. The unit displays indoor temperature, humidity, and pressure, as well as outdoor temperature and humidity—and many sophisticated features and options are available. All sensors operate using 433 MHz up to 300 ft., even through walls. The unit has a weather forecast icon that predicts weather from barometric trends, reportedly with 75 percent accuracy. The weather station is priced at $499 and includes the display unit, all sensors, and mounting hardware.

For details, contact Scientifics®, a Division of Edmund Scientific, Dept. A011-C999, 60 Pearce Ave., Tonawanda, NY 14150-6711 (1-800-728-6999; e-mail: <cons_order@edsci.com>; <http://www.scientificsonline.com>).

Accessories for the Shack

Jensen Tools JTK-53 Deluxe Communications Kit. Do you have trouble getting your "tool act" together? If so, Jensen Tools' JTK®-53 Deluxe Communications Kit (photo B) may be what you need.

The JTK-53 is Jensen's most versatile toolkit for the installation and maintenance of communications equipment. The kit offers some 114 tools in all, including a cable stripper for coax/twisted pair, a 3/8 inch coded drill and drill bit set, fish tape, a hex-blade set, a nut-driver set, seven pairs of pliers, full-size and miniature screwdrivers, a soldering iron, a 14-piece socket set, a staple gun, a punch down tool with 66 and 110 blades, three wire-stripper/crimper/cutter tools, and adjustable and ignition wrenches. The kit is available in three case styles.

For more details and pricing, contact Jensen Tools, Inc., 7815 S. 46th St., Phoenix, AZ 85044-5399 (1-800-426-1194; e-mail: <Jensen@stanleyworks.com>; <http://www.jensentools.com>).

CAIG Laboratories CircuitWriter Pen. CAIG Laboratories, Inc., has introduced an innovative and very useful new product, the CAIG CircuitWriter (photo C), a precision conductive pen-and-ink system that applies instant traces on most surfaces such as epoxy, glass, plastic, or metal. CircuitWriter draws traces on circuit boards, repairs defective traces, makes jumpers, and shields electronics. It also helps when designing prototype circuits and even repairs automobile rear-window heater traces.

A related product called CircuitSealer also is available to provide a protective

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Photo B– Do you have trouble getting your "tool act" together? If so, Jensen's JTK®-53 Deluxe Communications Kit may be just what you need. The very complete kit offers some 114 tools in all. (Photo courtesy Jensen Tools)

conformal coating over CircuitWriter traces. Both products are available in a 7 ml pen format, as well as in 59 ml and 354 ml liquid dispensers.

For more information and pricing, contact CAIG Laboratories, Inc., 12200 Thatcher Court, Poway, CA 92064-6876 (phone 1-800-224-8123; e-mail: <caig123@caig.com>; on the web: <http://www.caig.com>).

Antennas and Accessories

SGC-239 Smartuner Antenna Coupler. We have mentioned the SGC folks in several columns, providing thumbnail profiles of several of their "ruggedized" communications products. In business for some 30 years, beginning in 1971, SGC has become a leading supplier of exceptionally sturdy communications products, including commercial/military-quality SSB mobile and base-station transceivers and RF accessories. In recent years SGC has sought to increase sales in the amateur market, offering a wide range of HF products.

One of the firm's newest products is the SG-239 Smartuner Antenna Coupler, designed to work with any HF transceiver and longwire antenna or coax-fed, multi-resonant antenna, even at the window of a condo or on a small house roof. The new SG-239 fits the coupler requirement of many contemporary low-cost transceivers, using the respected technology of the very popular SGC Smartuner series.

According to the company, the performance features of the SG-239 are far ahead of its modest $199 price tag. The unit will work with silent receiver tuning or within the range of 1.5 to 200 watts. It has 170 memory bins, with fast, accurate tuning via independent sensors, including VSWR, phase, magnitude, low impedance, and forward sensing (other couplers only sense the VSWR for a proper match).

For more information, contact SGC, Inc., 13737 SE 26th St., Bellevue, WA 98005 (phone 1-800-259-7331; e-mail: <sgc@sgcworld.com>; web: <http://www.sgcworld.com>). *Note:* At the SGC website, you can sign up to be informed monthly by e-mail about their newest products, latest specials, and best pricing.

Portable and Mobile Goodies

Maldol Single-Band HF Antennas for the Yaesu FT-817 Multimode Transceiver. NCG Company specializes in

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Photo C– CAIG Laboratories, Inc., has introduced an innovative new product, the CAIG CircuitWriter, a precision conductive pen-and-ink system that applies instant traces on most surfaces, such as epoxy, glass, plastic, or metal. (Photo courtesy CAIG Laboratories, Inc.)

both export and import of communications products and specialty items. NCG is the distributor for several Japanese-based product lines and companies, including Daiwa, Comet, Create, and Maldol. In fact, NCG Company has been doing business with radio amateurs for more than 31 years, now from its 10,000 sq. ft. manufacturing and distributing center in the Anaheim East industrial complex.

Recently, NCG announced a new series of Maldol products. The intrepid antenna engineers at Maldol Antenna have developed telescoping stainless-steel antennas for 40, 20, 15, and 10 meter operation, specifically for the popular Yaesu FT-817 Multimode Transceiver (photo D). The AH Series HF antennas, sporting BNC connectors, are well-balanced and weigh only about 3 oz. Collapsed length is less than 16 inches, and the extended length of the antennas is between 47 and 52 inches.

The 10 and 20 meter antennas can be purchased complete (they're $45.95 each); you configure other bands by purchasing the parts and assembling them to meet your specific needs. You can buy the Model AH-R telescoping whip separately for $17.95, and various single-band loading coils are available for $33.95 each.

For details, contact NCG Company, 1275 N. Grove St., Anaheim, CA 92806-2114 (1-800-962-2611; e-mail: <Micks@cometantenna.com>; web: <http://www.cometantenna.com>).

Software and Computers

Scancat-Gold for Windows Version 8.0. In previous columns we noted innovative software products developed by Computer Aided Technologies. Under the tutelage of Jim Springer, N5JMZ, since 1989 the firm has offered a variety of software programs and products to enhance scanning and shortwave listening. Probably the best-known product is Scancat-Gold for Windows, for computer control of modern scanners.

Jim notes that he's been working very hard not only to improve his Scancat software, but also to support the many features customers have asked him to

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support. Scancat-Gold Version 8.0 is his answer to these requests.

According to Jim, Scancat-Gold has all the power you need to fully support over 65 conventional and trunk tracking scanners in a single program. Features include a "basic" scanning interface for computer-controlled simplicity without "screen overload," a tabbed graphical user interface, a separate trunk tracking module, database sharing with any other supported radios, sound recording, autologging, tagging and auto-programming of favorite groups, database export and import, and much more.

Several program versions are available. Scancat-Gold for Windows "SE" is $159.95 (upgrade for $59.95); Scancat-Gold for Windows is $99.95 (upgrade for $29.95).

For more information, contact Computer Aided Technologies, P.O. Box 18285, Shreveport, LA 71138 (1-888-722-6228; e-mail: <scancat@scancat.com>; <http://www.scancat.com>).

From the Bookshelf

Reflections II: Transmission Lines and Antennas. Armond Noble, N6WR, Worldradio Books publisher, has announced that Worldradio has printed a second edition of the standard-setting book by Walt Maxwell, W2DU, as *Reflections II: Transmission Lines and Antennas.*

Like the first edition, *Reflections II* is designed to help dispel the half-truths and outright myths that many people believe about transmission lines, standing waves, antenna matching, reflected power, and antenna tuners. Besides giving "King SWR" a serious cross-examination, the book provides a wealth of authoritative information on matching networks, antennas, and the use of the Smith Chart.

With the updated and expanded material presented in Walt's new book, you can help clear the air when these important but very controversial topics are discussed. Indeed, a special objective of the 24-chapter, 416-page, large-format book is to improve knowledge among amateurs of reflection mechanics and transmission-line propagation. While written with scientific precision and accuracy in mind, the book is still highly readable and readily understandable by non-engineers.

Many readers of this column probably are familiar with Walt Maxwell's impressive credentials. He was a long-time ARRL Technical Adviser (TA) and, from 1960 until retirement in 1980, in charge of the RCA Astro-Electronics

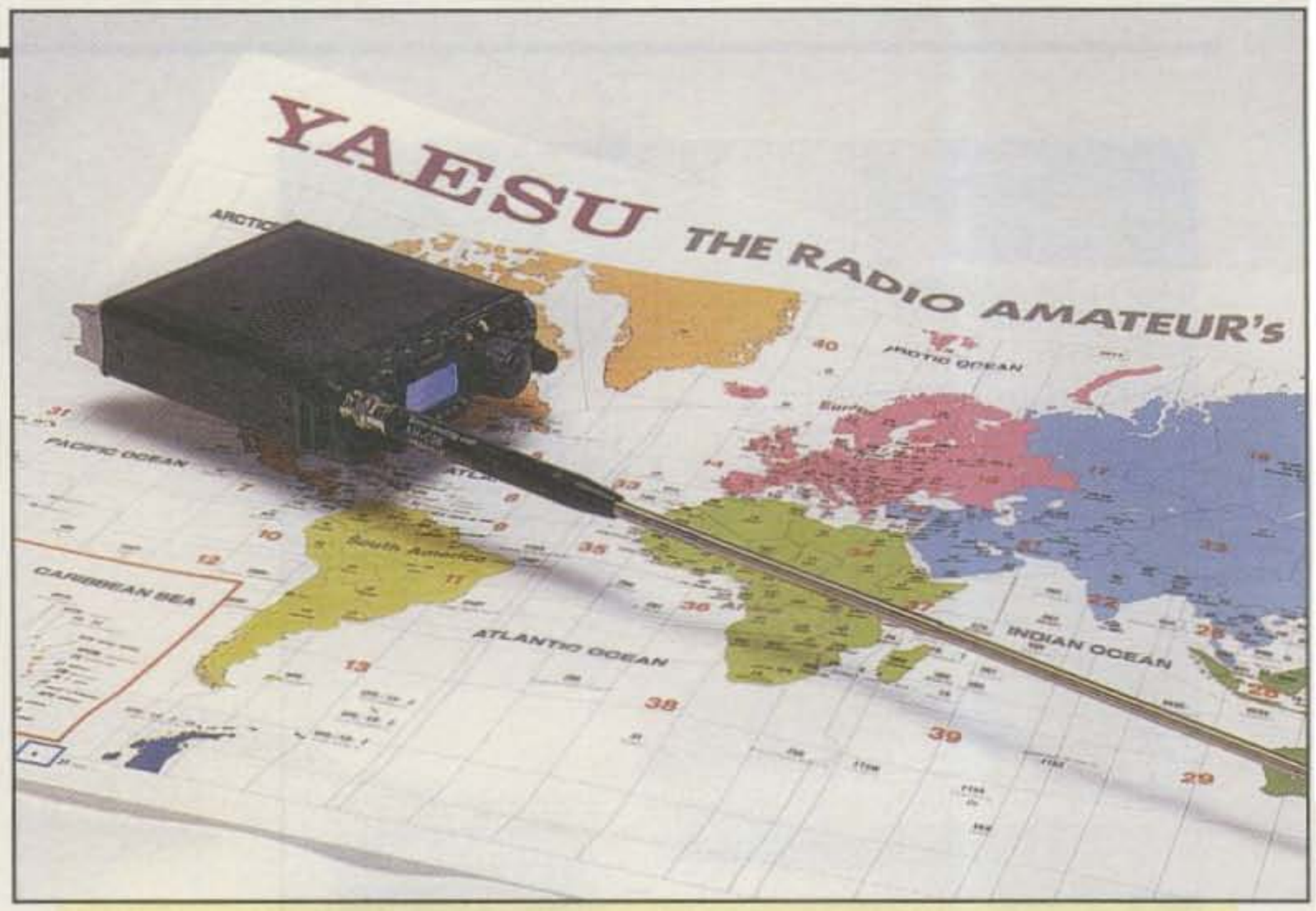


Photo D– The engineers at Maldol Antenna have developed telescoping stainless-steel antennas for 40, 20, 15, and 10 meter operation for the popular Yaesu FT-817 transceiver. The antennas, sporting BNC connectors, are well-balanced and weigh only about 3 oz. Collapsed length is less than 16 inches and the extended length of the antennas is between 47 and 52 inches. (Photo courtesy NCG Company)

Division Space Center Antenna Laboratory and Test Range.

The new W2DU book is published at $19.95 plus $4 s/h by Worldradio Books, 2120 28th St., Sacramento, CA 95818 (916-457-3655; e-mail: <n6wr@ns.net>; <http://www.wr6wr.com>). *Note:* A nice plus is that you can download the BASIC computer programs mentioned in the book from the Worldradio website.

High Frequency and Microwave Engineering. Although it's oriented primarily toward the mobile-phone and computer-wireless industries, E. da Silva's *High Frequency and Microwave Engineering* is chock full of specialized information for the more technically inclined radio amateur.

The nine-chapter, 429-page book/CD-ROM combo carries the Newnes imprint. It includes authoritative information on the basic features of radio communication systems, transmission lines, Smith Charts, various amplifiers and filters, oscillators and frequency synthesizers, and more. Included with the book is a CD-ROM containing CalTech's PUFF CAD software package for radio and microwave design and layout. The price is $52.95.

For more info, contact Newnes, an imprint of Butterworth-Heinemann, 225 Wildwood Avenue, Woburn, MA 01801-2041 (phone 1-800-366-2665; e-mail: <custserv@bhusa.com>; web: <http://www.bh.com>). The publisher offers many titles in computing, electronics and electrical engineering, broadcasting, film and TV, video and audio, and other technology fields.

How to Expand & Upgrade PCs. Is it time to modernize and upgrade that trusty, but long-in-the-tooth PC? A new book by PC guru Preston Gralla is designed to give you everything you need to know about upgrading and expanding your computer, presented in clear, step-by-step instructions. The book is *How to Expand & Upgrade PCs,* and it's $29.99 from the Que Publishing division of Macmillan Publishing USA. The 25-chapter, 262-page book is amply illustrated and includes a detailed glossary and index.

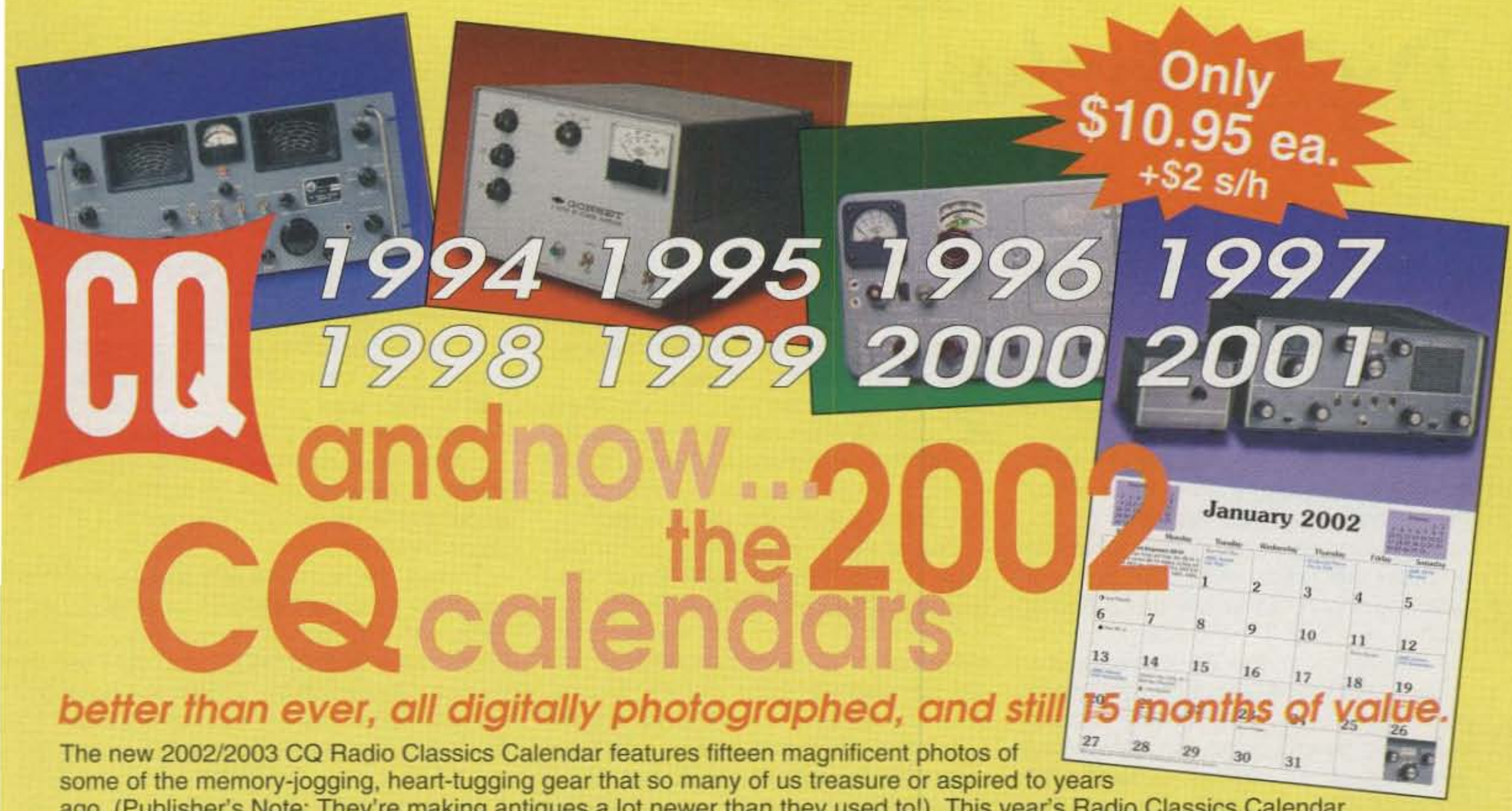
For more information, contact Macmillan Publishing USA, 201 West 103rd Street, Indianapolis, IN 46290-1097 (phone 1-800-858-7674; e-mail: <info@mcp.com>; web: <http://www.mcp.com> or <www.quepublishing.com>).

Wrap-Up

That's all for this time, gang. Next time more "What's New." See you then.

Overheard: Bear in mind that when everything in the hamshack is going wrong, things always seem better after you've had a good night's sleep.

73, Karl, W8FX



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Here's what's featured this year:

Collins 75S-3 Receiver, 1961; Lakeshore Bandhopper VFO, 1957; Gonset Commander II Mobile HF Transmitter, 1955; Gonset 913A 6 meter amplifier, 1964; Technical Materiel Corporation (TMC) GPR-92 Receiver, 1964; Hammarlund HQ-170 Receiver, 1958; McElroy Model 100 Straight Key, 1941; Sonar XE-10 Modulator, 1947; National NC-300 Receiver, 1955; Hallicrafters S-85 Receiver, 1954; Heathkit SB-500 VHF Transverter, 1969; Sideband Engineers SB-34 Transceiver, 1965; Swan 400 Transceiver, 1964; Drake TR-3 Transceiver, 1963; Utah UAT-1 Transmitter, 1937.

How many do you recognize? How many did you own? How many did you wish you owned?

The 2002/2003 CQ Amateur Radio Calendar brings you fifteen spectacular digital images of some of the biggest, most photogenic Amateur Radio shacks, antennas, scenics, and personalities. These are the people you work, the shacks you admire, the antenna systems you dream about having, all digitally captured by the talented Larry Mulvehill, WB2ZPI, CQ's own roving cover photographer. Larry's travels this year took him to Colorado, Montana, Wyoming, Texas, Florida and New York, capturing some of the greatest Amateur Radio photos of the year especially for this annual favorite calendar. From winter scenes of the frosty northeast to pedestrian mobile in the Rockies, you'll love this traveling Amateur Radio photo show.

All calendars include dates of important Ham Radio events such as major contests and other operating events, meteor showers, phases of the moon, and other astronomical information, plus important and popular holidays. The CQ calendars are not only great to look at, but they're truly useful, too!

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Digital Wireless

BY STEVE STROH, N8GNJ

Packet Radio and Beyond

Sometimes We're Our Own Worst Enemy

I'm a member of a loosely-organized group of "networking" amateur radio operators in the Seattle, Washington area that I call the Puget Sound Amateur Radio TCP/IP Group. (The group's web page is at <http://wetnet.wa.com>.) In the more than ten years that I've been associated with this group, we've done some amazing things in amateur radio networking. For one, our network is one of the few that's based "purely" on TCP/IP (the "language" of the internet, for the abbreviation-impaired). That is, all the routing and transport is done using "raw" TCP/IP instead of relying on an underlying networking system such as FlexNet or Net/ROM. For another, we have a number of 9600 baud bit-regenerative[1] repeaters on the air, some of them located on cellular-telephone towers. We were very active in implementing Linux as routers, and had a full-time internet gateway that was located at a major Seattle-area internet service provider.

In most ways, what we have built is a full-blown wireless internet access system, albeit at "low" speeds of 9600 baud. (If you're used to 1200 baud half-duplex packet radio, once you experience the use of 9600 baud on a bit-regen repeater, you're really spoiled and it's tough to go back to 1200 baud half-duplex.)

The main purpose of the TCP/IP network is experimentation... and learning, in my opinion, two of the higher purposes of amateur radio. We regularly gain new users to the system, and the system continues to evolve with new capabilities. Recently we've added a link to the 56 Kbps repeater in Vancouver through a router located north of Seattle that can see both one of our 9600 baud repeaters in Seattle and the Vancouver-area 56 Kbps repeater in Vancouver. It's likely that at some point in the future all of the routers in our network will be converted to IPv6, and we can all start learning about IPv6 on a working network (that we can afford to break).

It's with considerable dismay, then, that one of the key resources in the Puget Sound Amateur Radio TCP/IP network came under attack recently—by a fellow amateur radio operator.

One of the key repeaters in our network is the 146.98 9600 baud data repeater located on Mount Baldi. This repeater is in a key location to cover almost all of western Washington, and can be reached from a number of locations in eastern Washington. It's the only bit-regenerative repeater on 2 meters in western Washington. Not only is it bit-regenerative, it's operating at 9600 baud. It's truly a unique resource.

Like every other metropolitan area in the U.S., all of the 2 meter repeater pairs in western Washington are allocated. Also like every other metropolitan area of the U.S., amateur radio operators have an absolute plethora of 2 meter repeaters to access. Granted, some of them are "special purpose," with operations on that repeater reserved for special functions or groups such as Search and Rescue or membership in a particular club, but most voice repeaters on 2 meters go almost completely unused.

To me at least, it was mind-boggling that anyone could *want* to put yet another voice repeater on 2 meters in the Seattle area, but apparently there's a backlog of requests to do just that, and the queue is years deep.

The situation that will likely lead to the 146.98 9600 baud data repeater being removed from service is that the coordination for this repeater "lapsed." That the "coordination lapsed" is entirely in the realm of the policies of the local repeater coordination group, the Western Washington Amateur Relay Association (WWARA).

By their policies, when renewal paperwork for "re-coordination" of 146.98 wasn't submitted in a timely manner, the 146.98 repeater pair became available... *despite the undisputable fact that the 146.98 9600 baud data repeater remained on the air!* (A claimed point of confusion is that when listening with a voice radio, 9600 baud transmissions can't be "heard.")

Spotting this "opportunity," an amateur radio operator requested coordination for a new (voice) repeater on 146.98 and was granted coordination. At that point the 146.98 9600 baud data repeater was deemed, *solely by the policies of the WWARA,* to be "interference" to the newly coordinated 146.98 voice repeater.

To me, the question is a simple one: Are the purposes intended for amateur radio served when a unique resource such as the 146.98 9600 baud data repeater is forced off the air to make room for yet another voice repeater that likely will largely be unused? I don't think so.

Lyle Johnson, Prophet

In his banquet speech at the 1996 ARRL and TAPR Digital Communications Conference (text and audio of which is available online at <www.tapr.org/tapr/html/Flyle.banquet.html>), Lyle Johnson, WA7GXD, postulated about the feasibility of creating the Amateur Radio Service (assuming that it didn't already exist) in 1996 (instead of 1934), and if such a service would offer sufficient benefits to the public to justify the use of the increasingly crowded spectrum. Some of his comments seem chillingly prophetic in the context of the 146.98 9600 baud data repeater situation. Excerpt begins:

> In the 1970s, FM repeaters suddenly took over the landscape in Ham Radio when it went from basically zero in 1970 to five thousand today and I imagine that eight years ago it was four thousand, nine hundred and fifty. What's happened today in 1996? You go to Ralph, your local frequency coordinator, and say, "Ralph, I need a frequency for my repeater" and Ralph just kind of says, "What else is new?" Right? There aren't any. So Ralph, your local frequency coordinator, he's empowered as a kind of a God now. He can hand out these frequencies, these frequencies that are worth millions and millions of dollars. Ralph controls them now. And Joe Ham, who's a repeater owner, carefully warehouses that spectrum. He doesn't use it much but he wants to be sure nobody can use it either, so he has his frequency coordination thing. Meanwhile he goes to another channel that Ralph gave him so he can run his remote base on the mountaintop so he can call CQ DX. And that's cool, that's good.
>
> But somebody else went up to a local

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[1] Bit regeneration is like real-time digipeating, except that bits aren't stored in transit; the bits are received, "re-clocked" in the regen circuit (basically, a FIFO, or first-in-first-out), and transmitted nearly simultaneously.

mountaintop with a spectrum analyzer one day and they scanned two meters. And they noticed that "I can't get a repeater allocation, yet if I scan this band and make a graph over twenty-four hours, I'll find that this band is maybe being used five percent." Maybe in our area it's being used twenty percent, but I doubt it. There's something wrong here. So we're very busy organizing things so we can warehouse spectrum with closed repeaters that other people can't use. There's something wrong here I think. Does this sound like a good idea to you? That we promote this, we organize ourselves around this, and we defend this?

Now if you were a public policy maker, how would you feel about this? How would you react to the creation of this kind of a Service? Neither would I. Well, now we've got this what we call Little LEO controversy. The low earth orbiting guys, and they sat up there with their spectrum analyzer and noticed the same thing. So now they've gone to the policy makers, and among the candidate bands, and we've all read the *QST* editorials; there's two meters and seventy centimeters on the table for consideration. Not to be taken, but to be shared. And we're treating this, and I suppose properly, as a call to battle—we have to battle those little LEO guys. "We can't possibly let them share our spectrum—this is our sacred stuff." Joe's gotta have his warehouse because Ralph gave it to him, right? I don't look at this so much as a call to arms... I think it's a wake-up call.

I think that if we look at ourselves objectively, we have to say that we're grossly inefficient and that we're wasteful. We've been given a precious public resource and we're not utilizing it properly. Now if the Little LEO guy can put his spread spectrum satellite on top of two meters and claim that he's not going to interfere with us and he'll accept whatever we can dish at him because he knows how to handle it... Well, it's hard to argue that we're not going to share this underutilized resource with you because... because Ralph said it belonged to Joe... And I believe that this coexistence has been demonstrated to some extent with the STAs that were mentioned earlier in the Spread Spectrum talks today.

I would submit that a single 9600 baud data repeater, in a band crowded with voice repeaters used perhaps 1 hour out of 24, is a better, higher use of a repeater pair in advancing the goals of the Amateur Radio Service than yet another voice repeater.

Within the last few weeks yet another "spectrum grab" of amateur radio spectrum has commenced. The biggest controversy raging in the commercial wireless field is the question of where in the RF spectrum allocations of the U.S. "3G" wireless telephone services should be placed. Most other parts of the world have agreed to a standardized set of spectrum that in the U.S. is

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allocated to military use, including satellite communications. In the U.S. there won't be any easy answers to the "3G" spectrum problem, and the pressure to find more spectrum for new services is building. I seriously doubt that amateur radio will be able to "defend its turf" in the next big battle regarding use of its spectrum.

The Death of Metricom

As I write this (very close to deadline), Metricom has died as a corporate entity, and the disposal of its assets at auction will commence shortly. Metricom was the parent company of the innovative Ricochet wireless internet access system. Ricochet used a network of nodes mounted on streetlights to relay to "Wired Access Points" (WAPs) where data packets transitioned from wireless to wired infrastructure. Ricochet offered 28 Kbps mobile internet access in San Francisco/San Jose, Seattle, and Washington, DC. In 2000 it began offering Ricochet II 128 Kbps mobile wireless internet access service in other areas such as San Diego, Los Angeles, and a number of other cities. Ricochet and Ricochet II were a technical success, but a business failure.

Of interest to hams, Ricochet (28 Kbps) used Frequency Hopping Spread Spectrum (FHSS) technology and operated as a digipeater network in the 902–928 MHz Industrial Scientific and Medical (ISM) band, which amateur radio shares. Ricochet II (128 Kbps) operated as a "full duplex repeater" with user access on 902–928 MHz, and backbone connections between poletops and WAPS on 2.4 GHz (also an ISM band) and licensed 2.3 GHz Wireless Communications Service (WCS) band (ironically, in this discussion, removed from the Amateur Radio Service a few years ago).

There is considerable speculation that even if a last-minute purchase of Metricom's assets occurs, there will be considerable amounts of Ricochet equipment appearing on the open market. Some poletop units have already appeared on eBay. There are a number of discussions underway about the possibility of resurrecting parts of the Ricochet networks (particularly in the San Francisco area where it's been operational for at least eight years). There are also some discussions underway about how Ricochet equipment could be modified for use in amateur radio.

In many, many ways the Ricochet network was every bit, and more, of what amateur radio networking aspired to be. It was low power, low profile, peer-to-peer, reasonable speed TCP/IP. Ricochet modems can be connected peer-to-peer, and software is available for Ricochet modems to connect in a "star" network configuration. If a number of features of the Ricochet network are familiar, that's because Ricochet was inspired by the first amateur radio Net/ROM digipeater/backbone networks in California.

It's purely speculative at this point, but surplus/modified Ricochet equipment may well be used to form the basis of new amateur radio networks. If enough of the Ricochet technology could be understood, perhaps spread spectrum radios could be developed for amateur radio use in the 420–450 MHz band. Note that the 902–928 MHz band offers approximately the same amount of spectrum as 420–450 MHz. Since FHSS technology works well in 30 MHz at 902–928 MHz, it can likely be made to work at 420–450 MHz. As to interference potential, it seems unlikely (to me) that a transmission of <100 mS on the input of a voice repeater channel will impact the repeater's operation very severely, especially when the repeater is idle more than 90% of the time.

During the TAPR Spread Spectrum Special Temporary Authority (STA) that preceded the most recent Part 97 rules change relating to Spread Spectrum operations, I received an interesting e-mail message from an amateur in California. He had built a Frequency Hopping Spread Spectrum system, and as a test of *real world compatibility* with voice repeaters, programmed his system's hopping pattern to use *only the input channels* of voice repeaters in the area. No one even noticed his Frequency Hopping Spread Spectrum system in operation! To me, that said a lot.

As always, comments and questions on these and other topics are welcome, and greatly appreciated.

73, Steve, N8GNJ

CQ Sneak Previews on "Spectrum"

Tune into a sneak preview of each upcoming issue of CQ, with Editor Rich Moseson, W2VU, the fourth weekend of each month on the "Spectrum" radio program, broadcast worldwide on shortwave over WWCR Radio, 5.070 MHz, Saturdays at 11:00 PM Eastern time.

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Public Service

BY BOB JOSUWEIT, WA3PZO

Public Service and Emergency Communications

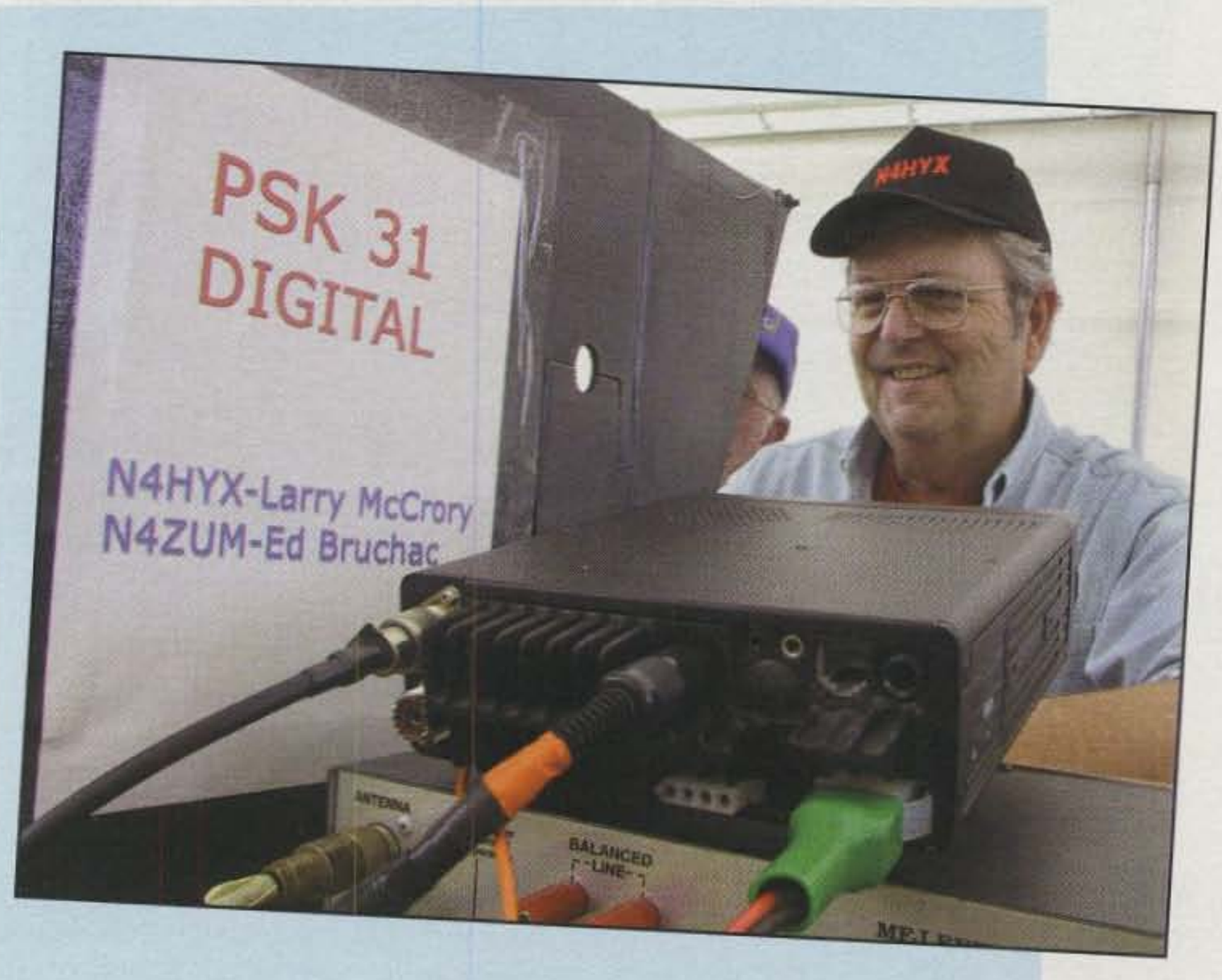
New Threats Call on Skills of Hams

A recent call by internet security experts for amateur radio help has sparked interest and discussion. This month we'll take a look at the internet, the experts' concerns, and how amateur radio might be able to help.

"The internet has become indispensable to our national security and economic well-being," says Ron Dick, head of the National Infrastructure Protection Center, a branch of the FBI. In July two serious attacks on the internet took place. According to the SANS (System Administration, Networking, and Security) Institute the Code Red "worm" infected more than 250,000 computer systems in just 9 hours on July 19th. Dick said, "Worms like 'Code Red' pose a distinct threat to the internet. This type of attack has the potential to disrupt business and personal use of the internet for applications such as electronic commerce, e-mail, and entertainment."

At the same time the *Sircam* virus infected many e-mail systems, including some of those used by ham radio operators. The ARRL reported that more than 1000 *Sircam* virus-infected e-mails showed up at ARRL headquarters in a week. The virus affected big business, government agencies, and individuals' PCs.

According to Lawrence Gershwin, national intelligence officer at the CIA, U.S. businesses will "increasingly become the point of attack for enemies of [the] United States" by hackers and national governments using sophisticated weapons such as worms and viruses that can be used for precise attacks."



Could PSK31 help restore the internet after a disaster? Here Larry McCrory, N4HYX, of Chelsea, Alabama makes HF digital contacts during Field Day. (Photo courtesy David Black, KB4KCH)

Real Disasters Cause Real Problems

In the spring and summer fairly localized emergencies affected the internet around the world. Effects such as these may sometimes be far removed from the site of the problem.

Last spring, heavy rains from Tropical Storm Alison flooded the Houston, Texas area. Corporate IT (information technology) departments were sent scrambling to restore computer systems and communications in affected buildings downtown. Many companies had generators, computers, and data communications equipment in their basements. When the buildings flooded and power was lost, critical data stopped flowing as well. At the Harris County government offices in Houston five of 26 buildings were knocked completely off-line due to the flood waters, which ravaged underground utility and communications tunnels, destroying wiring, phone cables, and other systems.

In July a train derailment and fire in a tunnel near Baltimore, Maryland's Camden Yards baseball stadium destroyed critical cables carrying internet communications, disrupting communications along the East Coast and in other areas as well. For example, a telephone call center in western Maryland that handles campground reservations for the state of Michigan was knocked off line. A Citicorp customer-service center lost two-thirds of its lines. The loss of a critical cable in one tunnel affected the internet's infrastructure. One monitoring service reported huge network slowdowns in Seattle and Los Angeles that were attributed to the train wreck. If a single fire could cause an interruption of internet traffic, one can imagine what a large-scale disaster could do.

ARRL President Jim Haynie, W5JBP, was quoted in the news media as saying "If the internet went down today, it wouldn't change my life one bit. It's nothing for me to go into my ham shack and flip one switch and talk to New York or Bulgaria or the Ukraine."

This may be true as long as you don't try to make a purchase with a credit card. In the aftermath of Hurricane Andrew in 1992, residents of devastated Homestead, Florida had to purchase merchandise out of the back of trucks because the stores were badly damaged or destroyed, and they had to pay cash. Why? There were no credit-card machines to record the purchases.

c/o CQ magazine
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Is severe weather the only type of storm to which hams will be asked to respond? The newest storms may be over the internet. (Hurricane Andrew photo courtesy of NOAA)

Credit-card transactions simply were not possible because there were no data lines available. Consumers were drawing large amounts of cash out of the bank so they could purchase food and supplies. In some cases generators were selling for as much as $2000.

Can Ham Radio Help?

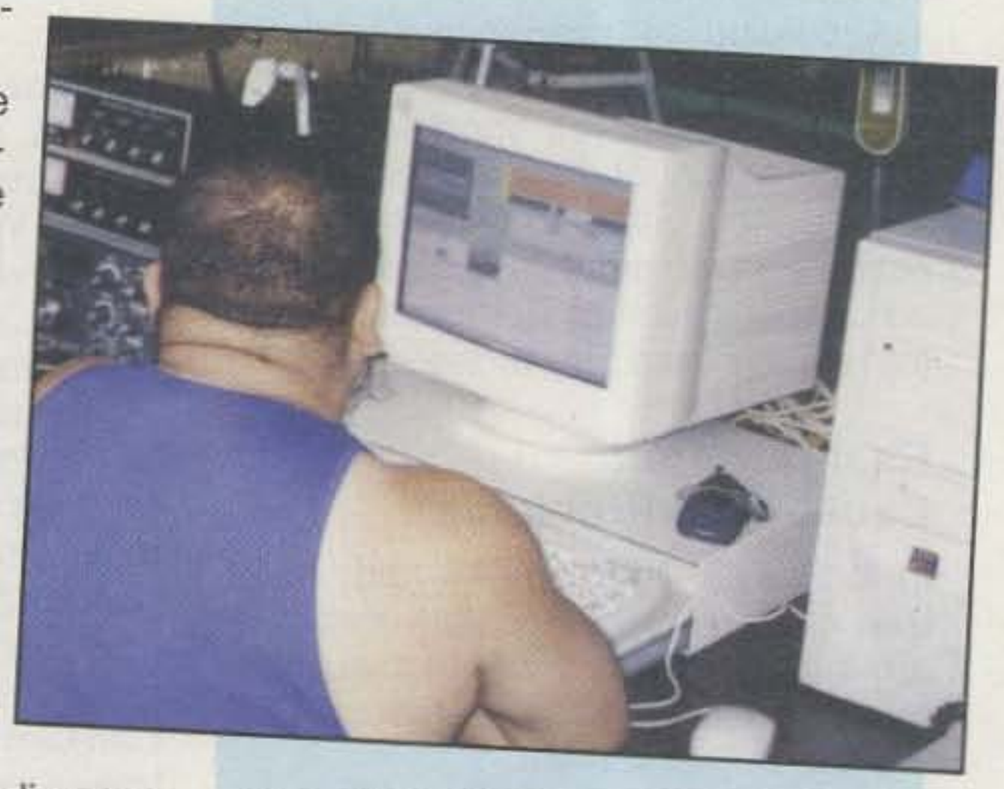
The SANS Institute has begun recruiting amateur radio operators to take part in an emergency communications network that it said could be used by disaster relief personnel in the event of a catastrophic failure of telecommunications systems, including the internet. SANS asked all interested hams and packet radio operators "to take a leadership role to help establish and maintain" such an emergency backup communications network. The SANS Institute is a cooperative research and education organization made up of many security practitioners in government agencies, corporations, and universities around the world who invest hundreds of hours each year in research and teaching about network security.

Project manager Scott Conti, N1LYW, of the University of Massachusetts, says, "the purpose of this project is to promote discussion and coordination towards establishing an Emergency Communications Network supported via amateur radio operators and the SANS community. This network will be an out-of-band method of providing assistance in restoring network functionality in the event of widespread network and telecommunications failures or disasters." Conti is a volunteer for this project. He says his interest in the project came from an article in a SANS newsletter.

Will amateur radio replace the internet? Conti says amateur radio will *not* replace the internet. Instead, information would be passed to help restore order to the internet or other disrupted services. "There are definitely restrictions to be considered," says Conti. "Clearly, this information would have to be transmitted un-encrypted. There is also the 'third party rule' when you start scaling this globally." Agreements between governments allow amateur radio operators to pass a message on behalf of a non-ham or third person. Conti says, "Potentially it could be anything from IP addresses or ports that should be blocked, locations of websites, router modifications, or small patches that need to be applied. Sometimes the solution to a network problem does not require much actual data and is well within the capabilities of amateur radio."

Is this an appropriate and legal use for amateur radio? The answer is "it depends." There are many restrictions that have to be considered, but I believe that this could be an excellent use for amateur radio," says Conti. "Hams have proven over and over that they can operate where and when no other communications service was functional. As more of our critical infrastructure is connected to the internet, the potential for disruption of multiple services increases as well. If important information needs to be passed in order to restore emergency services, and amateur radio is the only way, it is going to be legal. Hams assist now when only cell service is disrupted."

Some have questioned whether ham radio may be used for this purpose. The FCC rules say: "97.401(a) When normal communication systems are overloaded, damaged, or disrupted because a disaster has occurred, or is likely to occur, in an area where the amateur service is regulated by the FCC, an amateur station may make transmissions necessary to meet essential communication needs and facilitate relief actions." Clearly the damage or disruption of the internet by a disaster would allow amateur radio to help out. It does not have to be about "life and safety." Amateur radio was called upon to provide communica-



Will other digital modes such as SSTV help emergency planners? Peter Santiago, KB3EBG, of Philadelphia exchanges pictures during Field Day. His Field Day operations were only a few miles from an area hit by severe flooding during Tropical Storm Alison. (Photo courtesy WA3PZO)

Internet Terminology

Worms, viruses, and cyber attacks are terms which have developed new meanings recently. These are not fishing bait, the common cold, or a sudden attack on someone. These are real world threats to our daily life. Just look at the White House and the Pentagon shutting down public access to their websites for fear of being infected by a worm.

For those who may not be familiar with the terms, a worm is a self-replicating virus that does not alter files but resides in active memory and duplicates itself. Worms use parts of an operating system that are automatic and usually invisible to the user.

A virus is a piece of programming code usually disguised as something else that causes some unexpected and, for the victim, usually undesirable event and that is often designed so that it is automatically spread to other computer users. Viruses are commonly transmitted by sending them as attachments to an e-mail note.

On the internet, a distributed denial-of-service (DDoS) attack is one where a flood of incoming messages to a targeted system or website essentially forces it to shut down, thereby denying service to the system to legitimate users.

tions during the Y2K crisis and now hams are being called upon again to provide a critical link in the event of future disasters on the Information Superhighway. The ARRL Board of Directors recently affirmed that the League would continue to work with internet security organizations to develop and improve capabilities to support emergency communications needs of those responsible for ensuring that the internet has high reliability.

Critical Cities

Initially SANS is looking for hams in specific cities. These include Honolulu, HI; Indianapolis, IN; Dahlgren, VA; London, England; Austin, TX; Washington, DC; Kapaa Kauai, HI; San Jose, CA; Melbourne, Australia; Manchester, NH; Colorado Springs, CO; Fredericksburg, VA; San Antonio, TX; Boston, MA; Atlanta, GA; Ottawa, Ontario, Canada; and Kuala Lumpur, Malaysia. Conti says these cities were picked because "these cities are locations where SANS has participants in their Internet Storm Center project <www.incidents.org>. The exact identities of these sites is deliberately not divulged."

SANS Institute Security Expert Stephen Northcut, who founded the Global Incident Analysis Center, explains the ultimate goal of the project: "It only takes one time connecting to the internet without protection and you don't even have to download a file to become infected. In the past, it was possible to run anti-virus software to clean up your system. Today we have variations from which you cannot recover, the software equivalent of HIV, if you will. Once you are infected, the attackers literally own your system and can use it for anything they want, including infecting others, and so the size of the problem gets bigger and bigger. Well, with enough compromised systems under the command of attackers, you could just about drop the internet."

Emergency Communications?

"If the internet was impacted, would it affect the phone system?" asks Northcut. "We know that during hurricanes and earthquakes all available circuits have been used up. This would be compounded by people like me who switch to phone dial-ins when my broadband connectivity fails. In fact, all circuits being busy has happened during non-emergency times as well. So it isn't all that likely, but a focused coordinated attack could take out the internet and as a secondary effect, disable the phone system."

"Now of course we can recover, but how do we recover? We analyze the attack and deploy countermeasures. How would we do this if we lost e-mail and telephone? Smoke signals? Well, radio might work, and with packet radio it would even be possible to send critical digital data. There are a ton of caveats and restrictions, but anyway you slice it," says Northcut, "you (ham radio operators) have high bandwidth and lower latency than smoke signals or drums.

"What I have found to be even more interesting," say Northcut, "though it actually makes perfect sense, is how technically adept these radio folks are. A lot of them really know computers and information security. I expect that we will find they aren't just an out-of-band network to connect the analysts that need to respond to an attack. They will almost certainly be able to help in the analysis as well."

What are Hams Doing?

Hams have been networking almost since the beginning with CW and voice-message-handling networks around

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Oops...

It's unusual that a spelling error has an interesting story to go with it, but this one does: Among our 50 inaugural inductees into the *CQ* Amateur Radio Hall of Fame (July 2001 issue, p. 14) was the man responsible for bringing affordable VHF equipment to the amateur market. His company was named Gonset, but Faust Gonsett, W6VR, spelled his name with two "T"s. Also, the firm was simply Gonset Co., not Gonset Laboratories, as we originally printed.

The story, from Faust's son, Bob Gonsett—also W6VR, having secured his late father's callsign under the vanity program—was that trying to fit the seven-letter Gonsett name into the company's diamond logo simply didn't look good. So, rather than finding a new logo, Faust Gonsett decided to make the company's name Gonset with one "T," which looked just great in the diamond logo! *(Tnx, W6VR)*

Plus, we messed up yet another callsign in the Hall of Fame listing, this one a particular embarrassment because it's the call of a former *CQ* editor. The last callsign held by Larry LeKashman, ex-W9IOP and W2IOP, was W2AB, not W2AD. Tnx to the several people who pointed it out.

International Third-Party Traffic

Occasionally hams are asked if they can pass a message to a friend in another country. A DX station might ask you to pass a message to someone else in the United States, or an unlicensed friend or family member may be at the mic when you make a DX contact. The ARRL Regulatory Information Branch says this is all right as long as the U.S. has signed an official third-party traffic agreement with that particular country, or the third party is a licensed amateur. The traffic must be noncommercial and of a personal, unimportant nature. During an emergency, the U.S. State Department will often work out a special temporary agreement with the country involved, but in normal times never handle traffic without first making sure it is legally permitted.

U.S. amateurs may handle third-party traffic with:

V2	Antigua/Barbuda	C5	Gambia, The	OA	Peru
LU	Argentina	9G	Ghana	DU	Philippines
VK	Australia	J3	Grenada	VR6	Pitcairn Island*
V3	Belize	TG	Guatemala	V4	St. Christopher/Nevis
CP	Bolivia	8R	Guyana	J6	St. Lucia
T9	Bosnia-Herzegovina	HH	Haiti	J8	St. Vincent & the Grenadines
PY	Brazil	HR	Honduras	9L	Sierra Leone
VE	Canada	4X	Israel	ZS	South Africa
CE	Chile	6Y	Jamaica	3DA	Swaziland
HK	Colombia	JY	Jordan	9Y	Trinidad/Tobago
D6	Comoros, Fed. Islamic Rep. of	EL	Liberia	TA	Turkey
TI	Costa Rica	V7	Marshall Islands	GB	United Kingdom**
CO	Cuba	XE	Mexico	CX	Uruguay
HI	Dominican Republic	V6	Micronesia, Fed. States of	YV	Venezuela
J7	Dominica	YN	Nicaragua	4U1ITU	ITU - Geneva
HC	Ecuador	HP	Panama	4U1VIC	VIC - Vienna
YS	El Salvador	ZP	Paraguay		

Notes:

**Since 1970 there has been an informal agreement between the United Kingdom and the U.S. permitting Pitcairn and U.S. amateurs to exchange messages concerning medical emergencies, urgent need for equipment or supplies, and private or personal matters of island residents.*

***Limited to special-event stations with callsign prefix GB (GB3 excluded).*

Note: At the end of an exchange of third-party traffic with a station located in a foreign country, an FCC-licensed amateur must transmit the callsign of the foreign station as well as his own callsign.

(The above information courtesy the ARRL.)

the country. In the past hams have worked with digital networks involving teletype. Now a variety of digital signals are being sent on the ham bands. These include packet, APRS, and PSK31. While packet radio is limited to 300 baud on HF and 1200 baud on 2 meters (due to bandwidth limitations), much higher speeds are allowed above 900 MHz. In fact, large files are being passed using the ftp protocol.

Business Week Online suggested that the "new ham" may be among us. The author sees many people, some of them hams, creating their own wireless internet with out-of-the-box hardware and software. If you are in one of the cities mentioned and would like to help, check out the SANS Emergency Communications Network forum at <www. sans.org/sansforums>. Alan Fedeli, director of emergency response services at Atlanta-based security software vendor Internet Security Systems Inc. (ISS), applauded the approach suggested by the SANS Institute and said any attempt to establish alternate communications channels should be supported.

Serving in the Public Interest

This month we have reported on new ways that hams can serve in the public interest. There are many commercial interests in the frequencies we have. This may be one way of better utilizing the frequencies we have to serve in the public interest. Do you have a story to tell of how your group is helping your community? Public service is not always a form of communications. It may include education. Drop us a note and let us know what you are up to. Until next time...

73, Bob, WA3PZO

QRP

BY DAVE INGRAM, K4TWJ

The Art of Low-Power Hamming

Gearing Up for QRP Fun

Two of the most popular attractions of QRP continue to be its high fun-per-dollar ratio and the remarkably small size of associated gear. Indeed, the go-anywhere flexibility of modern QRP transceivers puts you right in the middle of today's hot HF action regardless of your location, spare time, or budget. Those same factors, incidentally, often limit our use and enjoyment of full-size 100 watt setups.

A dazzling array of rigs and accessories is presently available to modern QRPers. Heading that list at this time are MFJ's Cub and 90 series transceivers, SGC's deluxe SG-2020 transceiver, Elecraft's fancy K1 and K2 kit transceivers, and the Yaesu/Vertex new FT-817 transceiver. All but one of these rigs have been discussed in recent QRP columns (probably because my plans to purchase an FT-817 are akin to an on-again/off-again love affair), so the time has arrived to discuss the new FT-817 (also see the review in the April 2001 issue). Say you assumed such after studying photo 1? Okay, let's begin with details on that "Outbacking with QRP" story and then shift focus to the FT-817. Fair enough?

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Outbacking with QRP

As illustrated in photo 1, life in the QRP lane truly has its benefits. Here Rhonda Comer, KG4FVL (a.k.a. "The Ham Goddess") lets the old pros wrestle with their heavy-duty gear at Field Day while she has a blast of fun with a little Yaesu/Vertex FT-817. Are we serious? You bet amigo radio aficionados! Rhonda rocks the bands and bags all the prime DX with QRP! Even after Field Day she continued walking right through the pile-ups and working good DX such as YBØ/Indonesia while running less than 50 watts with her "big rig."

Yes, friends, and there is more than just good hype here, too. Rhonda is a shining example of our new generation of radio amateurs, and encouragement that there will be a future generation of amateurs, a concern all of us should consider quite seriously. She works at an exceptionally demanding job, commutes over 100 miles round trip daily, and has precious little spare time, yet her enthusiasm for hamming pegs the meter. Rhonda acquired her Tech license in late 1999, and with the encouragement of her husband, Tony, K4KR, she passed her General license exam in April 2001. Rhonda then took to HF DXing and QRP like a duck takes to water!

So how did little miss QRP acquire the title of the "Ham Goddess"? She expressed enthusiasm for acquiring an HF

Photo 1– Like many new-generation HFers and proud FT-817 owners, Rhonda Comer, KG4FVL, a.k.a. "The Ham Goddess," prefers working SSB rather than CW on QRP—and she does great with it, too!

Photo 2– One of the local radio club members (Glenn, KE4YZK) kisses the ring of the "Ham Goddess" during her crowning ceremonies at a club meeting. Meanwhile, fellow amateurs (behind cameraman) struggle with foot-in-mouth entanglements. (Photo courtesy Robert Cain, N4IXT)

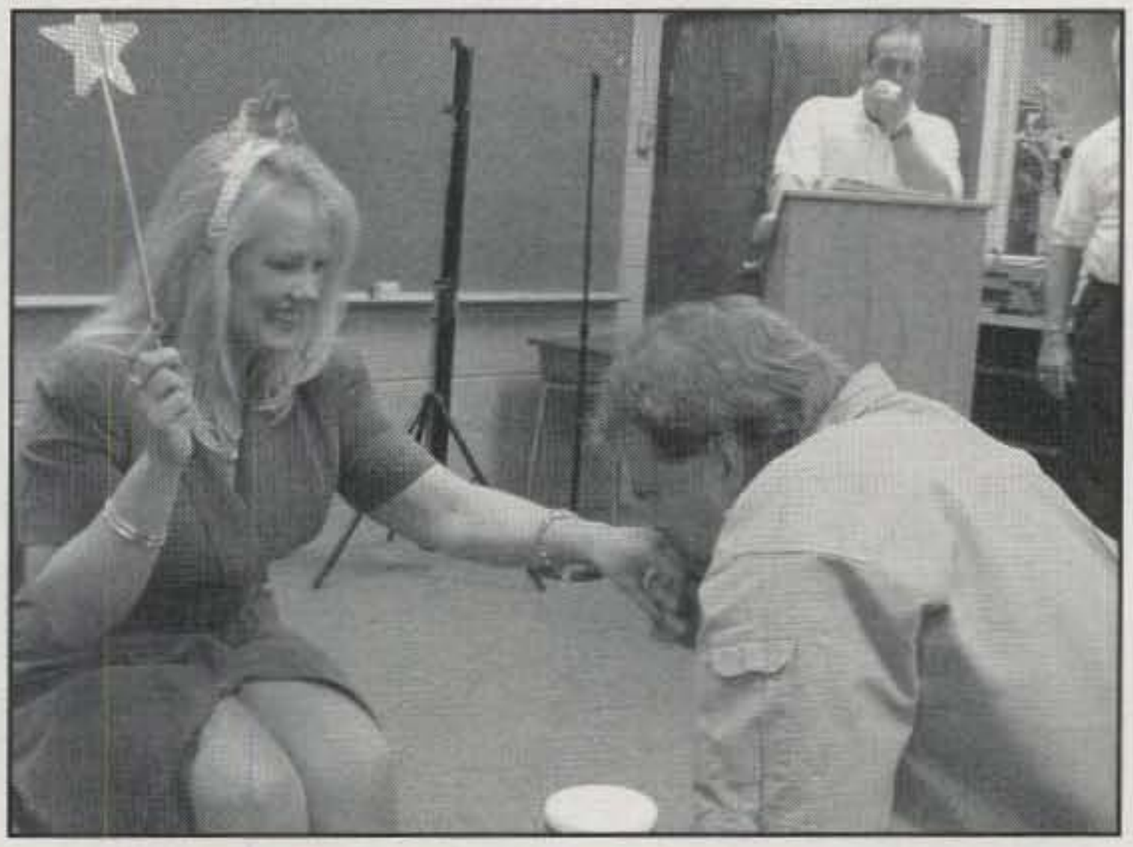

Photo 3– The Yaesu/Vertex FT-817. The unbelievably small and super-featured unit is the first generation of ultra-portable "do it all" transceivers. The rig is also being supported with a continuously increasing number of terrific after-market accessories. (Photo courtesy Yaesu/Vertex)

license, and, like typical encouraging males, several local club members said she would never do it (as Buddy Holly sang, "that'll be the day"). A challenge ensued. If Rhonda failed, she would bow down and address the boys as "lord" and "sire." If she succeeded, the boys would bow down, chant "Hail to the Ham Goddess" and kiss her ring. Photo 2 shows just who won! Would you like to congratulate Rhonda? Then listen for KG4French Victorian Lace in the General portion of 20 meters SSB on weekends and say hello. Just do not tell her that working exotic DX with QRP can't be done. She will certainly prove you wrong every time!

How It's Doing: The FT-817

Like many of you, my interest and enthusiasm level went off scale when Yaesu/Vertex introduced their new FT-817. Here in one unbelievably small package is a 5 watt all-mode 160 through 6 meter plus 2 meter and 70 cm transceiver complete with full shortwave coverage and internal battery pack (photo 3). Just sling it over your shoulder, add a small multiband antenna, and you are set for big-time QRP fun anywhere and anytime. Awesome! This little gem is tops for emergency preparedness or survival communications. You can use it to monitor foreign news broadcasts, follow underworld and guerrilla activities, communicate via local area FM repeaters, and just say hello to friends both near and far during normal or calm times. It is the ideal "do it all radio," a full communications system in one tiny box!

After first hearing about the FT-817, I started scrounging loose coins, calling in markers, and selling extra gear to purchase my own FT-817 (This is going to be a fun rig, I thought to myself!).

Before my funds reached "purchase level," however, first-look reviews were published in *CQ, QST,* and in the *QRP Quarterly* magazine. All three reviewers voiced the same opinion of the optional CW filter being more of a necessity than an accessory for the little delight. Hmm . . . Reading further, I also learned the FT-817 utilized semi-QSK rather than full break-in operation, its keyer lacked dot/dash memory, and SWR metering capabilities were challenging to menu access. I then talked with several FT-817 owners and they added hollow-sounding transmit audio, RF feedback via the external DC input line, and ineffective AGC to the list. Serious drawbacks, you ask? Not for the first generation of a new-style transceiver, I would say. Furthermore, I am still convinced the operator rather than the rig makes the big difference in hamming success.

I really wanted an FT-817, so I started visualizing solutions, concessions, and more fancy "frills" to fit my needs and make it an even better rig for others. My notes and findings follow. Check them out. They will help you enjoy your FT-817 to the max.

Horizons-Expanding Ideas

First, T/R switching time can be menu-set to simulate full break-in operation by "dropping out" or receiving between letters or words rather than "holding in" throughout a full CW transmission. Then a Tick keyer or chip (available from Embedded Research, P.O. Box 92492, Rochester, NY 14692; web: <www.frontiernet.net/~embres>) can be added for deluxe CW operation. The Tick sports dot/dash memory, one or two transmit message memories, beacon mode, right- or left-hand paddle operation, and more, and all functions (including speed adjust) are accessed via a single push-button. A Tick can almost make an FT-817 an automatic operating rig. It is a gem.

Finding an SWR bridge as small or smaller than the FT-817 can be rather challenging, but it (and a small antenna tuner) are very important accessories when operating portable or using off-the-wall (condo balcony?) skywires. The ideal solution here is combining both items in one package such as the LDG Z-11 Automatic Antenna Tuner with SWR monitor shown in photo 4. The Z-11 measures only 1.25"H × 5"W × 8.5"D and is available from LDG Electronics (1445 Parran Road, St. Leonard, MD 20685; toll free1-877-890-3003; or <www.ldgelectronics.com>). It handles up to 60 watts, matches almost any coax-fed antenna, and tunes automatically with the touch of a single button. There is even a slave unit and cable that plug into the FT-817 and provide automatic mode selection and T/R switching when the Z-11's "Tune" button is punched. The tuner draws only a few ma of current while tuning; then its latching relays hold their tune-setting so it draws zero current during normal operation. The Z-11 also includes panel-mounted LEDs for reading SWR levels whenever the unit is switched "on" and regardless of whether the tuner is or is not in line. It is super-neat! *(See*

Photo 4– The SWR of a quick-assembled dipole, delta loop, or vertical whip is often slightly higher than expected, but LDG's new Z-11 automatic antenna tuner cuts it down to size with the push of a button. It also includes built-in SWR metering to eliminate guesswork when operating portable. (Photo courtesy LDG Electronics)

Photo 5– Heil Sound's famous BM-10 headset gives you hands-free portable operation with an FT-817. Choose the BM 10-5 version, and you will have the best-sounding mini-rig on the air!

Photo 7– The optional fanny pack for the PowerPort FT-817 case carries the complete transceiver like a belt-clipped talkie. The rig case attaches to the fanny pack with two belt clips (supplied). the fanny pack has two generous- size zippered compartments for carrying additional accessories.

Photo 6– Cutting Edge Enterprises' new PowerPort case for the Yaesu/ Vertex FT-817 coddles the transceiver in soft padding. It also includes an extra compartment for an optional Power Port battery pack or other accessories.

N7RR's sidebar for a device that makes using the Z-11 even easier—ed.)

Taking the FT-817's SSB and FM audio from "flat" to "fantastic" is also a cinch: Just replace the rig's hand microphone with a little Heil BM-10 headset with boom mic (photo 5). The headset is available with your choice of mic element. I favor the HC-5, as this full-range/mini Goldline element will really make the FT-817 sound great. If you are a serious QRP SSB DXer, however, you may prefer the limited-range HC-4 "DX element." It gives the FT-817 more "talk power" and helps compensate for the lack of a speech compressor.

Remember to get Heil's AD-1YM Yaesu/ modular/FT-817 mic plug adapter when purchasing a BM-10, and you are set to rock. Need more mic info? Just ask Bob Heil or his well-informed assistants at Heil Sound, Ltd. (5800 North Illinois, Fairview Heights, IL 62208; telephone 618-257-3000; web: <www.heilsound.com>).

Clearing RF feedback entanglements in the FT-817 is also easy. The RF re-enters the rig via its external DC power socket, so just add a round snap-on toroid core like that used on a computer monitor cable to the "transceiver end" of the DC supply's cable (a good idea for any home or mobile setup, too). A handy toroid is item number 623-04444167261, available for $2.21 from Mouser Electronics at 1-800-346-6873.

Sidestepping the CW filter requirement and AGC problem involves what I

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Three New Add-Ons for the Yaesu/Vertex FT-817

By Bruce Prior, N7RR
e-mail: <n7rr@arrl.net>

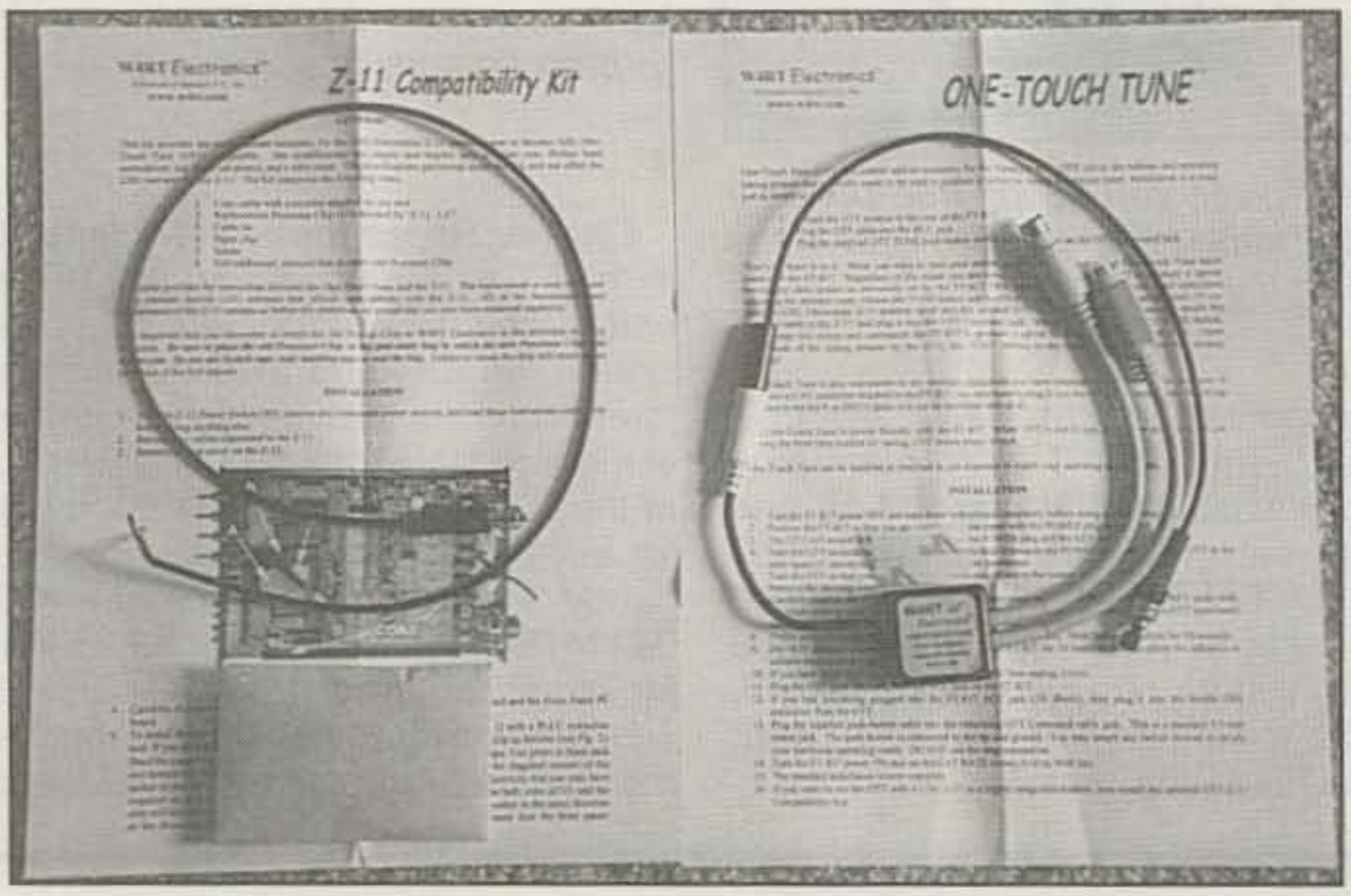
The extremely popular 160 meter through UHF all-mode, low-power Yaesu/Vertex FT-817 continues to attract new add-on products. W4RT Electronics has produced three of them.

The One-Touch Tune™ overcomes the lack of a tune function in the FT-817. It installs on the back of the radio and plugs into the accessory (ACC) socket in the rear of the FT-817, but a pigtail socket allows the operator to continue to use the ACC circuit for other purposes. From any operating mode one push of the plug-in switch transmits a carrier for use with an automatic or manual tuner.

Even more convenient, the associated Z-11 Compatibility Kit fires the One-Touch Tune™ from the front Tune button of the LDG Electronics Z-11 Auto Tuner. This combination enhances the FT-817 for any operator, but the two add-ons are especially helpful for visually-impaired operators.

The third add-on from W4RT Electronics is the One-Plus Power™ custom battery pack. The fully-fused 1650 mAh NiMH battery fits into the bottom of the FT-817. It includes a replacement battery cover door and high-adhesion rubber feet. The battery can be slow-charged through the internal FT-817 charger like the standard Yaesu/ Vertex accessory battery pack, but it can also be quick-charged through a charger jack. For maximum protection of the rig, the battery is automatically disconnected from the rig while quick charging.

Pricing is as follows: One-Touch™ $59.95 plus $7 s/h; Z-11 Compatibility Kit $9.95 including s/h plus $10 refundable deposit for the replacement Z-11 processor; One-Plug Power™ $59.95 plus $7 s/h. Contact: W4RT Electronics, 3077K Leeman Ferry Road, Huntsville, AL 35801; e-mail: <info@w4rt.com>; <http://www.w4rt.com>.



Installation of the One-Touch™ is a snap. The Z-11 Compatibility Kit is almost as easy, mostly requiring the replacement of the standard Z-11 processor.

Gene Iwanski, KB7UEN, and his guide dog, Princess, show off the FT-817 transceiver and Z-11 Auto Tuner with One-Touch Tune™ and Z-11 Compatibility Kit installed.

call "operating savvy." That is, you reduce the FT-817's AF gain and use its RF gain to control overall volume and avoid overloading by strong signals. You then use the FT-817's RIT/clarifier to tune a desired station for a real low pitch tone and just ignore the rest. Human ears, even those with dropouts or peaks in audio response, still make good CW filters!

Fun Time!

We have discussed easy fixes for most of the FT-817's "first generation" shortcomings. Now let's look at some special treats for this cult-inspiring mini rig. First is the padded "Worldpouch" carrying case available from Cutting Edge Enterprises/PowerPort (1-800-206-0115; </www.powerportstore.com>) and shown in photos 6 and 7. The case's main compartment holds an FT-817, and its zipper extends down the side for easy access to the mic plug/ socket. A removable waterproof bag for the FT-817 is also included in that compartment (jacuzzi portable, anyone?). A smaller front/top compartment holds an optional 12 volt/2300 mAh, 12 volt/ 2300 mAh rechargeable battery. A rapid/3 hour charger is included with that battery. As an alternative, an optional tray for six alkaline "C" cells or the rig's mic plus a miniature paddle can be stored in the compartment.

Finally, the carrying case has double belt clips on its back, an antenna pocket on its left, and two clip-anywhere swiveling mic hangers. An optional fanny pack "rounds out" the Worldpouch. It fits around your waist, supports the carrying case, and includes two zippered compartments to carry all kinds of accessories such as one of the new pocket-size 80 through 6 meter telescoping HF antennas. Say, what?

Yes, friends and fans, those little mini whips you see attached to and lying beside the FT-817 in photo 8 are miniature ATX "Walkabout" multiband antennas made by Waters and Stanton of the UK and sold in the U.S. by PowerPort. The antennas are akin to a break-down

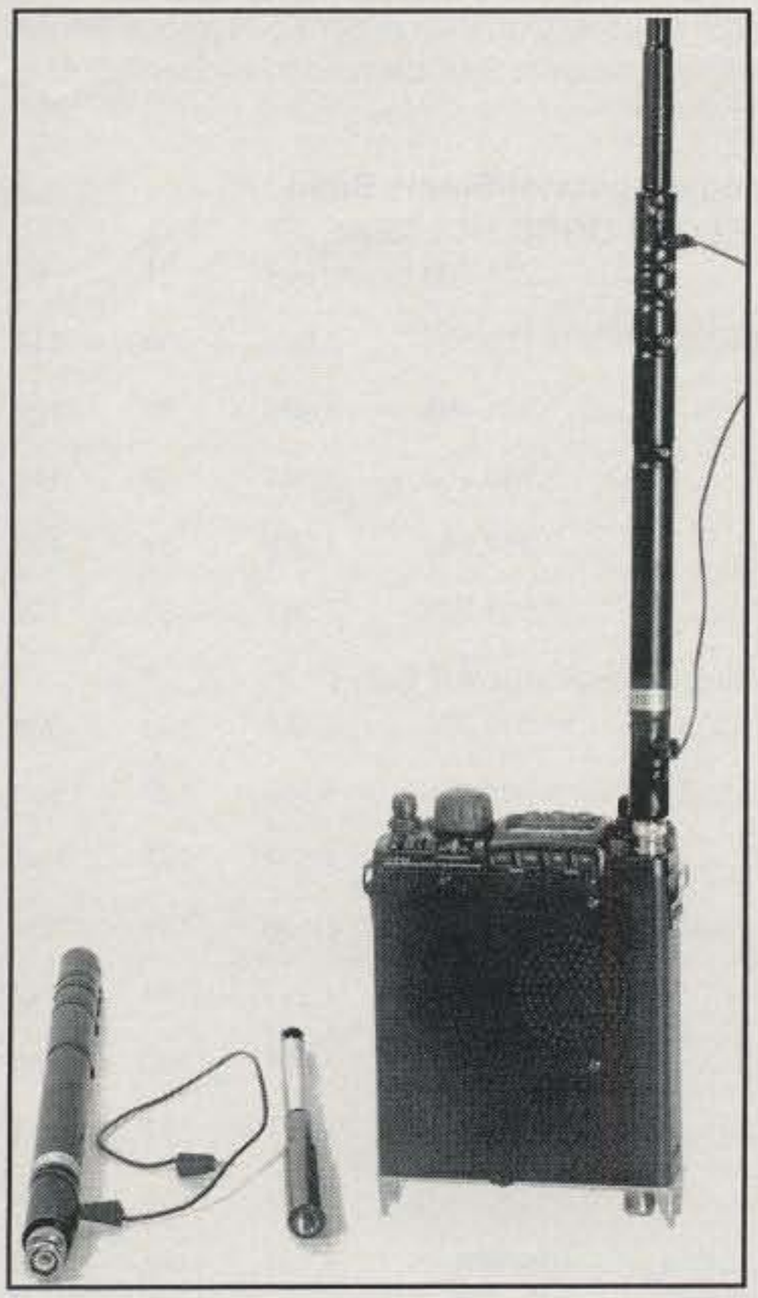


Photo 8– Notice the two miniature antennas in this picture, gang. They plug directly into the FT-817 (or any other HF QRP transceiver) and operate 80 through 10 meters, plus 6 and 2 meters. They are only 3 to 4 feet tall when extended, made by Waters and Stanton in the U.K., available in the U.S. through PowerPort, and they really work!

and pocket-size version of the famous Outbacker. Their lower section is 12 inches long and included a jumper lead you move between taps along its length to select 40 through 10 meter operation. The jumper is not employed for 80 meters (the full helical winding is used), and the upper section is collapsed down for 2 meter operation. You adjust that whip section, incidentally, to lengths between 18 and 48 inches for covering CW and SSB segments of 80 through 6 meters. The antenna's lower section is fitted with a BNC (or upon request, PL-259) connector, and plugs directly into your rig's antenna socket. I understand the antenna can handle up to 10 watts, so it should also work with other ultra-compact transceivers if they are set to low power. Waters and Stanton suggest adding a short counterpoise or ground-simulating wire to the FT-817 for best in-field use with this mini 'tenna (length determined by the formula 180/frequency in MHz = length in feet), and it is a very good idea. The antenna is too small to produce a band-blasting signal, but it is a neat accessory for weight- and size-conscious travelers.

Wrap Up

Yaesu's little FT-817 is proving to be more than just a new QRP transceiver; it is inspiring a new breed of traveling-light amateurs! Almost every day I hear of some exciting new goodie someone has developed for the FT-817. These items include carrying cases, quick-deploy antennas, tiny mics and keys, battery packs of all types, and more—items we plan to spotlight in upcoming columns. If you have a special gem to enhance portable operations in the great outdoors, let me know pronto and let's get some well-deserved attention headed your way. Meanwhile, keep on working QRP and having a ball with ultra-portable gear!

73, Dave, K4TWJ

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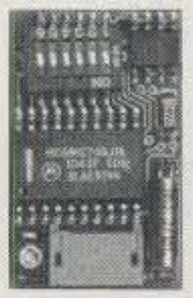

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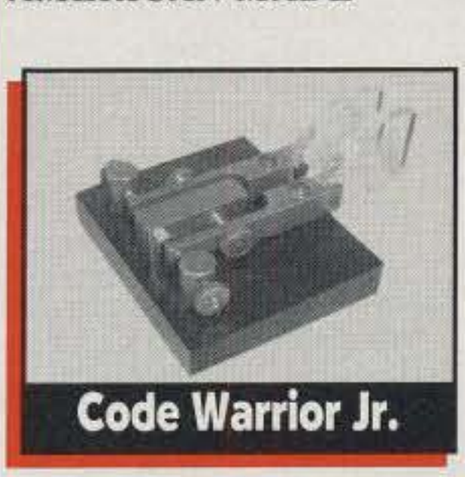

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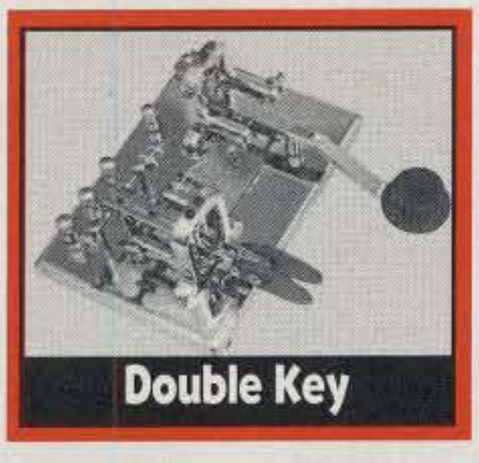

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CQ World-Wide DX Contest All-Time Records BY FREDERICK CAPOSSELA, K6SSS

These records represent the pinnacle of achievement by the true champions of contesting. We congratulate them on their success. Number groups after calls are: year of operation, total score, contacts, zones and countries. All-band and Multi-Operator records include a band-by-band breakdown of the world leader in each category.

Phone Single Operator/Single Band WORLD RECORD HOLDERS

1.8	IG9/IV3TAN('96)	441,252	1,203	24 102
3.5	IG9T('95) (Opr. IV3TAN)	816,959	1,938	33 110
7.0	IG9GSF('97) (Opr. IT9GSF)	1,249,236	2517	35 137
14	PYØFM('94) (Opr. PY5CC)	3,202,242	5,109	38 175
21	ZD8Z('94) (Opr. N6TJ)	3,481,925	5,535	36 179
28	ZD8Z('99) (Opr. N6TJ)	3,794,280	6,247	40 170

Single Operator/All Band

AF	EA8BH('99) (Opr. N5TJ)	25,646,796	10,253	176 692
AS	C4A('98) (Opr. 5B4ADA)	9,781,930	5,105	146 548
EU	GIØKOW('99)	10,457,664	6,375	155 589
NA	KP2A('93) (Opr. CT1BOH)	13,202,298	8,691	148 506
O	KH7R('00) (Opr. CT1BOH)	11,894,730	7,473	170 392
SA	HC8A('99) (Opr. N6KT)	18,607,050	8,638	175 595
QRP	P40W('00) (Opr. W2GD)	5,097,780	3,599	127 381
Low Pwr. Asst.	P4ØW('94) (Opr. W2GD)	11,224,877	6,323	131 470

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	150	13	54
EA8BH	3.5	547	18	80
(Opr. N5TJ)	7.0	682	27	97
(1999)	14.0	2,655	39	158
25,646,796	21.0	2,071	39	148
	28.0	4,148	40	155
	Total	10,253	176	692

Multi-Operator/Single Xmtr.

AF	C56T('98)	19,118,437	8,602	162 631
AS	P3A('00)	17,409,816	8,282	167 635
EU	IQ4A('90)	17,255,700	7,253	183 717
NA	VP2EC('92)	16,287,152	7,434	183 685
O	KH2S('91)	11,095,392	7,086	145 387
SA	PJ1B('93)	22,596,570	9,386	164 646

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	111	10	24
PJ1B	3.5	937	25	94
(1993)	7.0	1,055	29	114
22,596,570	14.0	2,011	38	147
	21.0	1,829	32	139
	28.0	3,443	30	128
	Total	9,386	164	646

Multi-Operator/Multi-Xmtr.

AF	CN8WW('00)	78,170,508	25,711	199 854
AS	P3A('98)	29,108,800	13,073	182 738
EU	LX7A('89)	26,578,978	14,947	175 751
NA	VP2KC('79)	37,770,012	17,767	175 677
O	KHØAM('90)	35,730,600	16,309	179 565
SA	PJ4B('99)	59,127,810	20,618	188 834

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	923	17	77
CN8WW	3.5	1,818	25	106
(2000)	7.0	3,545	37	138
78,170,508	14.0	6,737	40	177
	21.0	5,754	40	175
	28.0	6,934	40	181
	Total	25,711	199	854

CW Single Operator/Single Band WORLD RECORD HOLDERS

1.8	C4A('99) (Opr. 9A3A)	261,489	969	21 80
3.5	EA8EA('96) (Opr. OH2KI)	1,175,550	2,672	36 114
7.0	YV5A('95) (Opr. OHØXX)	1,364,465	3,095	35 122
14	P4ØV('91) (Opr. N7NG)	1,883,700	3,521	38 142
21	ZD8Z('97) (Opr. N6TJ)	2,357,967	4,589	39 140
28	ZX5J('99) (Opr. N6TJ)	2,131,942	3,962	39 152

Single Operator/All Band

AF	EA8BH('00) (Opr. N5TJ)	18,010,765	7,555	183 634
AS	C4A('98) (Opr. 5B4ADA)	9,904,510	5,508	162 503
EU	LY6M('99) (Opr. LY1DS)	7,140,784	4,634	163 558
NA	8P9Z('98) (Opr. K4BAI)	9,991,863	6,498	155 454
O	9M6NA('99) (Opr. JE1JKL)	7,402,265	4,211	169 442
SA	HC8N('99) (Opr. N5KO)	14,626,579	7,001	185 546
QRP	P40W('99) (Opr. W2GD)	5,024,800	3,277	137 413
Low Pwr. Asst.	V26K('98) (Opr. AA3B)	7,185,562	5,337	135 406
	P40W('94) (Opr.W2GD)	10,288,950	5,541	155 460

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	197	17	60
EA8BH	3.5	541	20	82
(Opr. N5TJ)	7.0	1,091	33	95
(2000)	14.0	1,601	39	129
18,010,765	21.0	1,746	39	134
	28.0	2,375	35	133
	Total	7,555	183	634

Multi-Operator/Single Xmtr.

AF	TS7N('00)	13,140,050	6,348	156 614
AS	P3A('99)	19,243,476	8,288	191 691
EU	RU1A('00)	12,753,600	5,670	203 757
NA	8P9Z('99)	18,711,252	8,245	192 669
O	AH2R('99)	9,244,890	4,728	180 515
SA	HC8N('95)	14,302,820	7,252	162 503

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	264	13	61
P3A	3.5	1,121	27	98
(1999)	7.0	1,535	35	121
19,243,476	14.0	1,825	39	136
	21.0	1,782	39	136
	28.0	1,761	38	139
	Total	8,288	191	691

Multi-Operator/Multi-Xmtr.

AF	CN8WW('99)	70,713,270	23,068	219 843
AS	A61AJ('99)	38,789,751	15,812	213 788
EU	OH2U('99)	22,244,067	10,956	211 786
NA	6Y2A('98)	39,279,140	17,609	192 740
O	KHØAM('92)	23,951,385	11,253	190 527
SA	PJ4B('99)	47,516,600	17,889	208 757

WORLD RECORD

Station	Band	QSOs	Zones	Countries
	1.8	1,694	24	100
CN8WW	3.5	3,248	35	121
(1999)	7.0	4,358	40	141
70,713,270	14.0	4,837	40	159
	21.0	4,319	40	161
	28.0	4,612	40	161
	Total	23,068	219	843

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CQ World-Wide DX Contest All-Time U.S.A. Records BY FREDERICK CAPOSSELA,

Tabulated below are the record-high scores achieved by U.S. contesters in the CQ World-Wide DX Contest. Number groups following calls and bands are: year of operation, total score, contacts, zones, and countries.

PHONE

Single Operator/Single Band

1.8	K1ZM('95)	55,420	215	15	70
3.5	K1ZM/2('96)	292,100	952	27	100
7.0	KC7EM('95)	409,446	1,083	34	95
14	K1OX('85) (Opr. KC1F)	1,131,328	2,176	36	140
21	K3RV/4('88)	1,270,478	2,298	39	148
28	W4ZV('99)	1,400,870	2,566	36	154

Single Operator/All Band

Station	Band	QSOs	Zones	Countries
	1.8	21	8	15
K1AR	3.5	154	16	59
(1999)	7.0	231	29	84
7,898,499	14.0	1,145	38	142
	21.0	1,150	36	123
	28.0	1,393	33	128
	Total	4,094	160	551

QRP

KR2Q('00)	1,507,506	1,181	104	358

Low Power

K1ZM/2('00)	3,368,010	1,907	151	504

Assisted

KI1G('99)	7,639,478	3,403	169	622

Multi-Operator/Single Xmtr.

Station	Band	QSOs	Zones	Countries
	1.8	32	12	30
K1AR	3.5	197	18	76
(1990)	7.0	154	26	95
11,193,606	14.0	1,370	39	167
	21.0	1,167	38	165
	28.0	1,517	37	170
	Total	4,437	170	703

Multi-Operator/Multi-Xmtr.

Station	Band	QSOs	Zones	Countries
	1.8	197	16	36
KC1XX	3.5	699	24	102
(1999)	7.0	746	31	119
25,963,386	14.0	2,711	40	185
	21.0	3,245	40	170
	28.0	2,596	36	170
	Total	10,194	187	782

CW

Single Operator/Single Band

1.8	K1ZM('95)	142,358	470	23	83
3.5	W1MK('00)	417,240	1,273	26	96
7.0	K1ZM('90)	839,520	1,783	34	125
14	K2WK('98)	1,007,781	1,955	39	144
21	K2SS/1('00)	974,440	2,035	36	134
28	W4ZV('00)	965,874	1,984	37	137

Single Operator/All Band

Station	Band	QSOs	Zones	Countries
	1.8	104	14	40
K5ZD/1	3.5	384	19	73
(2000)	7.0	971	29	103
8,756,568	14.0	988	33	105
	21.0	848	33	104
	28.0	1,189	33	106
	Total	4,484	161	531

QRP

K3OO('00)	1,731,450	1,299	114	371

Low Power

K1RO('00)	3,409,245	2,245	131	422

Assisted

K3WW('00)	8,465,815	4,091	166	589

Multi-Operator/Single Xmtr.

Station	Band	QSOs	Zones	Countries
	1.8	49	13	46
K1AR	3.5	569	27	101
(1998)	7.0	1,384	35	136
12,063,114	14.0	991	38	151
	21.0	999	36	135
	28.0	1083	32	132
	Total	5,074	181	701

Multi-Operator/Multi-Xmtr.

Station	Band	QSOs	Zones	Countries
	1.8	291	23	63
KC1XX	3.5	1,040	34	116
(1999)	7.0	2,119	40	138
24,602,524	14.0	2,155	40	155
	21.0	2,028	38	150
	28.0	1,947	38	148
	Total	9,580	213	770

Club Record: Yankee Clipper Contest Club ('99) 702,296,971
Team Contesting: Phone – Neiger's Tigers Team #1 ('99) 66,546,582
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Amateur Satellites

BY PHILIP CHIEN, KC4YER

Ham Radio in Space

Space Station and Field Day

Space station Alpha's Expedition 2 crew has done an amazing job with their ham radio station. In contrast with the Expedition 1 crew which limited its contacts to schools, private conversations with family and friends, and a handful of rare contacts over Russia, the Expedition 2 crew members went out of their way to spend extra time performing random QSOs with any hams interested in talking to them. Both American crew members Jim Voss (no call) and Susan Helms, KC7NHZ, spent much of their free time talking to hams and acting as goodwill ambassadors for the space program. Their commander, Yuri Usachev, RW3FU, did not make any random contacts over the U.S. but did talk with hams elsewhere.

This reporter was one of the many lucky hams to make it through the pileups, and amazingly it was QRP with an omnidirectional antenna!

It was June 1st and I had just come back inside my house after watching a visible pass of the space station as it passed over my QTH. I only had a handheld 3 watt radio hooked up to my home-built J-pole antenna. After tuning to the 145.800 MHz downlink frequency, I heard astronaut Susan Helms making random QSOs. I waited for a gap and jumped in.

I realized my chances were slim because of my lack of RF power or a directional antenna, but I had nothing to lose by trying, so I keyed the transceiver and said, "Kilo Charlie Four Yankee Echo Romeo Phil Chien." I was pleasantly surprised to hear her say, "Okay, Phil, I heard you in there." I replied, "Good to hear your voice, Susan." Then not unexpectedly I heard her say, "Phil, I lost you; sorry 'bout that" when I was stepped on by a more powerful station. Fortunately I had a digital recorder taping the downlink—now one of my most treasured recordings. It certainly wasn't the first time I had tried, or even the tenth, but it was worth the time and effort, even if the entire contact only lasted about ten seconds.

Therefore, I suppose I could legitimately claim that my 3 watt 2 meter handheld has a "range" of over a thousand miles! Or that a voice from the heavens called me by name. It's an interesting contrast: It's far more enjoyable to talk to an astronaut in space using my own equipment and skills in my hobby than it is for me to stand in front of a microphone and use NASA's worldwide assets to ask the same astronaut a question during a press conference as part of my job.

Several hams did abuse the space station's ham shack. At one point Helms politely told one ham to back off because she had already talked with him multiple times and wanted to give others a chance. More than one astronaut has noted that the hams with the highest power transmitters and directional antennas can certainly rule the airwaves, but it's a turnoff for them to talk to such a "bully" who is overpowering other users.

Unfortunately, too, there were the typical whiners who reflect badly on the amateur radio community, the ones who complained that the astronauts were never on over their locations or were always talking to other people and never answering their calls. As if the space station was put into orbit just for their own personal use!

Russian cosmonaut Yuri Usachev uses the ISS's ham radio transceiver.

In early April it was realized that as long as the space station's ham rig and packet module were powered on, even if no computer was attached it was possible to send unproto packets through the default callsign NOCALL. Fortunately, the FCC amateur radio regulations specifically exclude spacecraft crew members from the requirement of having a callsign, so it's quite legitimate.

The only way to use the packet module in this mode is to send an unproto text string to NOCALL on the packet uplink

779 Merritt Island Causeway #808, Merritt Island, FL 32952
e-mail: <kc4yer@cq-amateur-radio.com>

Susan Helms, KC7NHZ, operating the ham radio rig inside the International Space Station's FGB module. At the time the photo was taken (July 16 at 3:02 UTC), the shuttle Atlantis was docked to the space station and the two spacecraft were located over Russia. Note that Helms is wearing a 2001 Field Day pin.

frequency 145.99 MHz while the space station is over your horizon. Trying to connect to a non-existent computer will do you no good! If the space station's TNC hears your packet, it will repeat it on 145.800. The main issue is accidental interference. Because of the space station's altitude it can view thousands of square miles at once; we're not talking states, we're talking continents. If multiple packets arrive simultaneously, they'll just cause hash. The FM capture effect ensures that only the strongest signals will get through. Thus, once again a high power station can overpower others trying to get through. If many low power stations are trying at the same time, it's quite possible that nobody will get through, making the space station TNC appear unused.

Therefore, the proper protocol for the space station's TNC is to only send unproto text, never ever try to connect, and only try a limited number of times (say, for example, once per minute) for each pass over your QTH. Some folks have automated beacons transmitting a line of text with some ASCII graphics or their e-mail address or web page, and that's fine. Others use the ISS as an interactive live forum to send one-line messages to anyone who is monitoring the downlink or to specific callsigns they recognize in the downlink. That is also fine. However, there are many hams who do abuse the TNC by transmitting constantly and preventing others from getting in. Some stations (and I'm not naming any callsigns because they're actually advertising themselves as alligators by the number of times their calls appear in the downlink) are sending packets dozens—or even hundreds—of times during a nine- minute pass!

Does it really make sense to set up a computer to automatically transmit unproto packets constantly just so you can see your callsign, especially when every additional time you try probably prevents somebody else from getting through?

Even worse are automated stations which don't have tracking programs and just constantly transmit unproto packets on 145.99 24 hours a day. There are other satellites which use 145.99 MHz, including UO-14 and the Fuji birds; every packet received by those birds is interference. Certainly there will be times when, by coincidence, one of those birds is over your horizon at the same time as the space station, but those are the rare exceptions, not the rule.

"1A Battery on Space Station"

For ARRL Field Day on June 23, astronaut Susan Helms decided that she wanted to participate with the ISS set up as a Field Day station. She was informed through several sources about Field Day rules and procedures. Susan decided to keep her own log of all of her Field Day contacts instead of just relying on hams who contacted her via random QSOs to submit QSL cards. In a rather innovative way to stay within the rules, Susan initially used the designation Russian Maritime Mobile (since ISS has a Russian callsign and there is no specific category for spacecraft—yet). At one point she identified herself as "1A battery on Space Station." Actually, she should have been 1B, since 1A is a category for club stations or non-club groups made up of at least three licensed hams. Susan has an American ham license and Yuri Usachev has a valid Russian license, but Jim Voss has never taken a ham radio test or been granted an amateur radio license. Therefore, by the ARRL's rules the space station cannot qualify as a club station. Certainly, however, Susan can count as an individual participating in Field Day.

The space station definitely counts as mobile. When you're going five miles per second it would be absurd to put it in any other category. It's also a QRP station. Whether you consider a space station to be operating off emergency power (giant solar arrays capable of generating 75 kilowatts) or the same power as the rest of the ship is a matter of definition.

Susan's log includes hundreds of contacts. In many cases club stations made multiple contacts, even though the additional contacts don't count, just so everybody present could have the opportunity to talk to someone in space. Unfortunately, though, those additional contacts (you guessed it) prevented other stations from making a Field Day space station contact.

The ISS ham team arranged for a 2001 Field Day pin to be sent to her via the next shuttle mission to visit the space station, STS-104.

How Would Riley Deliver This Letter?

Jim Voss's lack of a ham license brings into question the legality of his making contacts with schools. Whether or not he could pass a test if he took it, or whether or not he received an education in how to use the ham rig on the space station, is besides the point. He is an American citizen, and the space station does have an American ham radio license in addition to its Russian one. Certainly Voss had the opportunity to take an amateur radio exam before

launch, but he chose not to. Therefore, if Voss is talking to non-hams on the ground it *must* be through a licensed control operator. However, it would be an unconscionable waste of the taxpayers' money to require Helms to be present to function as his control operator whenever Voss is making school contacts. Whether or not the FCC will try to fine Voss, or the ham radio operators at the schools he talked to, or the ISS ham radio team which arranged the contact, is a moot point. Each time Voss used ham radio without a licensed control operator present was, in my view, a violation of the FCC's amateur radio rules.

Unfortunately, there are those who want to censor discussions such as these about ham radio on the space station. AMSAT Vice President Ray Soifer, W2RS, posted to AMSAT's e-mail list "please remember that the sarex and amsat-bb reflectors are public places. Many people in positions of authority outside AMSAT (astronauts, NASA and ESA officials, etc.) read them. They can do us a lot of good for arranging future operations, or vice versa if they get turned off by the behavior they see on the net. If you must make a negative comment, please do so in a private message to the person involved (including to me if you don't like this one), and not to the outside world through the reflector."

However, when asked to cite any examples of "people in positions of authority" being offended by anything they read on the AMSAT mailing lists, Soifer refused to answer. It's disturbing to me that an AMSAT official would be encouraging self-censorship instead of free thought.

Space station is one of the most visible ham radio activities to the outside world. How the space station ham radio team on the ground instructs the astronauts to use their rig reflects on the ham community at large. It would be much better if the rules weren't treated carelessly or ignored in the interest of getting things done more easily.

A New ISS Crew

As we go to press, the Expedition 2 crew is returning to Earth and their replacements are taking up residence on the space station. They include American commander Frank Culbertson, KD5OPQ, Soyuz pilot Vladimir Dezhurov (callsign unavailable), and flight engineer Mikhail (Misha) Turin, RZ3FT. Thus, the Expedition 3 crew is the first space station crew where all of the crew members have their own ham radio licenses and callsigns. Nevertheless, it's quite possible they will use the station callsigns RØISS and NA1ISS.

Frank Culbertson spent over seven years in management as the U.S. director of the Phase 1 (shuttle-Mir) program and deputy director of the International Space Station. He was selected as an astronaut in 1984 after a career as a Navy test pilot. Culbertson flew as the pilot of the STS-38 classified mission and the commander of the STS-51 mission which deployed a NASA communications satellite and a German-U.S. astronomical satellite. When another astronaut asked to be removed from the Expedition 3 crew due to his heavy workload, Culbertson was one of the only astronauts with the proper experience and knowledge of the Russian language to take his place. He exchanged his business suit for his flight suit.

Vladimir Dezhurov was the commander of the Mir 18 crew, which included U.S. astronaut Norm Thagard. During their 115-day stay Dezhurov encouraged Thagard to use the ham radio rig. At first Thagard resisted because he didn't have a current ham license, but Dezhurov persisted, explaining that any space traveler aboard Mir was authorized under Russian law to use the ham station with the callsign RØMIR. Because that particular crew returned to Earth via the space shuttle, Dezhurov is the only Russian cosmonaut who has launched in a Soyuz spacecraft but never landed in one.

Mikhail Turin is the only rookie assigned to an early long-duration space station crew. He was an engineer for NPO Energia before he was selected as a cosmonaut. Both Russians have excellent English skills, rarely having to rely on interpreters.

As far as random contacts and preplanned school sessions go, Culbertson said, "I'll do the best I can to talk to as many people as possible. I'll definitely be talking to schools."

The Expedition 3 crew is scheduled to return to Earth in early December. Their replacements are Russian commander Yuri Onufrienko and Americans Carl Walz, KC5TIE, and Dan Bursch. Bursch does not have a ham radio license at present.

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Beginner's Corner

BY PETER O'DELL, WB2D

For the Newcomer to Ham Radio

Buying a New HF Rig

Sooner or later you are going to buy a new rig. (The holiday season is not so far off, for that matter.) How do you decide what to buy? You could simply decide on the basis of what looks pretty in the magazine ads, or you could go for the rock-bottom price in a particular class. The old saw "an ounce of prevention is worth a pound of cure" can be tailored to this situation: An ounce of research is worth a pound of adapting to a piece of equipment that just doesn't do what you want it to do. Before you pull out the plastic, do a little research and thinking. *(For a good overview of what's available today, see "CQ Market Survey: High-Frequency Transceivers for 2001," in the March 2001 issue of CQ.—ed.)*

What kind of research? What makes sense to me is first to find out what is on the market in your budget range. Then simply examine the features and specifications of the various contenders and factor that into your decision. What features? Which specifications? What do these specifications mean? It's easier than it sounds, and you definitely do not have to be a rocket scientist to make an informed decision. (You may, however, need a degree in computer science to be able to figure out some of the programming of a few of the more exotic transceivers on the market.)

For any given class of equipment, there are only a handful of specifications and features that are truly significant. What follows is my own personal list. Other operators with different experiences will probably have a slightly different list. The more experienced hams you can talk to, the better off you will be.

ICOM's IC-718 is designed with the first-time HF operator in mind, focusing on simplicity and ease of operation. However, it doesn't sacrifice features often found mostly on high-end radios.

Getting Started

To get started, look through this copy of *CQ* (and any other ham publications you can get your hands on). The ads will give you some of the models, but more important, they will give you an address, a phone number, and an internet address (URL) for most of the manufacturers. If you have a computer connected to the internet, it is a lot easier and faster to check out the rigs that way.

**123 NW 13th Street, Suite 313, Boca Raton, FL 33432*
e-mail: <wb2d@cq-amateur-radio.com>

Otherwise, you will either have to phone or write to the manufacturers and ask for brochures on the rigs (category) you are interested in. Another possibility is visiting a local dealer if you are fortunate enough to live near one, or going to a hamfest if one is coming up soon. The big one is the Dayton Hamvention, and that is over half a year away at this point (in May).

Why do you want the brochure on the rig? Because it gives you far more detailed information than the ad does. By the way, some of the manufacturers have turned their brochures into web pages. Some take still a different approach. Kenwood, for instance, has a short description on the web page and offers the complete brochure in Adobe PDF format (the Acrobat PDF reader is free on the web and will only take a few minutes to download). Go for the PDF brochure and print it. Depending on how your browser is configured, you may find that documents cannot be directly saved from the Acrobat Reader. However, if you know your way around the computer, you will probably find a copy of the document in the Windows/Temp folder. If you want to keep it for further reference, copy it to another folder.

Something else to keep in mind is this: Specifications are important, but so is being able to operate a rig *comfortably*. If at all possible, sit down in front of the rig you are considering and see how easy or difficult it is to do common, ordinary procedures—for instance, change bands, change frequency, change modes, raise/lower the volume, adjust filtering (if applicable), and so forth. If you have any thoughts of using the rig mobile, how well does the display read in bright sunlight? No matter how pretty the box is, a misplaced knob can make a rig a nightmare to operate.

HF Transceivers

Nowhere else in ham radio will you see the price range and corresponding range of features and specifications that you find in HF transceivers. I just flipped through several web pages and saw prices ranging from around $800 to nearly $3000 for a factory-built HF rig covering at least 10 through 160 meters and having at least 100 watts output on SSB. That does not include the kits, QRP rigs, and single-band units available today. Those radios will drop the lower edge even further.

There must be some difference in performance for such an extensive price range? The simple answer is yes and no. The "no" side of it is this: All the rigs on the market today are stable and produce a clean signal, and most of the

Kenwood's TS-50 is a reasonably priced HF-only radio covering 160–10 meters. It features dual VFOs for operating "split" (see text), as well as 100 memories. It can make a great HF starter rig.

low-end rigs of today will run circles around top-of-the-line ones from a generation ago. Plus, simple physics dictates that a station on the other end is going to be hard pressed to tell the difference between a 100 watt signal and a 200 watt signal. At least 90% of the time you will be able to copy a given signal with a low-end unit about as well as with a top-of-the-line job. So where is the difference? High-end rigs offer more features, more modes, more bands, and better filtering.

Filtering: One measure of a receiver's usefulness is its ability to separate desired signals from unwanted adjacent signals. Historically, the most effective means of handling this task has been a crystal-lattice filter network in the IF chain. A standard means of expressing the effectiveness of these filters is in terms of the shape factor. Bandwidth is measured at 6 dB and 60 dB down and stated in terms of a ratio—for instance, 2.8/3.6 kHz. The closer together the numbers are, the steeper the slope of the skirt (graphically, it looks like a lady's skirt), and the steeper the skirt slope, the better. For instance our hypothetical 2.8/3.6 kHz filter would be a better choice than one whose numbers are 2.2/3.7 kHz.

Recently, microprocessor technology has invaded the filter world, too. Digital Signal Processing (DSP) converts the analog signals to digital and uses computer routines to eliminate unwanted components. The digital stream is then converted back to analog. Initially, DSP was available only as an aftermarket add-on. Now manufacturers are including DSP filtering in their top-of-the-line units; some are even using DSP at the IF level! By its very nature, filtering distorts the signal to some extent. If at all possible, get on the air and test any unit you are considering with different filters to find the filter or combination of filters best suited to your tastes.

Better filtering means that the signals sound better and are far less annoying to listen to, particularly in crowded bands with marginal conditions. This is one place where the higher priced rigs make a significant difference. However, if you are a casual operator, how many times is that going to be an issue for you? You'll have to decide if it is worth the extra investment.

Technology has also allowed a steady march toward smaller, lighter, less-power-hungry units that outperform their behemoth ancestors. One limiting factor (so far, at least) is simply the size of the controls. For instance, if control knobs are too small, they become difficult to operate, particularly for someone with large hands. Some strategies for dealing with this dilemma have been to move away from knobs toward up/down buttons, to use computer control, and to radically change the location of knobs (for example, putting frequency control switches on a hand microphone). This is one reason why it's a good idea to "test drive" a transceiver before purchasing it.

VFOs: Despite recent advances, most amateurs and manufacturers still use terminology related to the earlier technology. For instance, true VFOs (variable frequency oscillators) have all but disappeared, having been replaced by frequency synthesis circuits. With the exception of low-cost QRP rigs, today's VFOs are usually digital memories and up/down counters. These units count pulses created by optical interruption circuits connected to the rotating shaft of the VFO knob. The user, though, will notice little difference in the functioning of a tuning knob connected to a digital VFO instead of a real

The Jupiter from Ten-Tec is a new-generation software-based radio. All of its major features are stored in Flash ROM, allowing a user to download new features on the internet and upgrade the radio without even plugging it in.

VFO. He or she will also notice increased convenience and versatility with the digital rig and maybe a difference in the feel of the two.

Whereas the true VFO is an analog device that tunes continuously, the digital VFO tunes in steps. The smaller the step, the more difficult it will be to notice the discrete steps of the synthesizer. In general, smaller steps are to be preferred. An added convenience is when the rig has a circuit to detect that the operator is attempting to go to the other end of the band quickly. In such cases, the circuit switches the tuning steps to some other increment, say from 10 Hz to 500 Hz. Such a design provides greater flexibility for the operator. He or she can tune slowly in small steps, zeroing in on the target, or rapidly in much larger steps when in a hurry to go from one end of the band to the other. Such versatility was not possible with true VFOs.

In today's digitally-based rigs it's customary to have at least two VFOs in each rig. This is in addition to the standard RIT (receiver incremental tuning) circuit which allows the operator to shift the receive frequency of a few Hz to maybe a few hundred Hz. Somewhat less frequently units feature an XIT (transmitter incremental tuning) circuit, which can also be very useful. However, a second VFO is almost an absolute necessity for split operation, often encountered in DXing and contesting.

Some rigs offer multiple, fully tunable memory channels (functionally very similar to having multiple VFOs). This might be of interest to an operator who regularly participates in a number of nets, for instance. Some rigs offer memories with programmable band limits. This feature can be useful for the operator who because of his license class or mode preferences needs to limit himself to certain segments of the band, and some rigs make these scanable. The casual operator may find little practical use for these extra memory features.

Some top-of-the-line rigs also offer what amounts to a second receiver built into the unit. Such designs allow the operator to monitor two frequencies simultaneously. This can be very useful in certain situations, such as contesting. For the average ham, and particularly for a newcomer, such bells and whistles are largely overkill. Ask yourself, "How often will I use this feature? Is it worth the extra money?"

If you look at the specifications section of a radio brochure, you will see all sorts of arcane terminology and lots of numbers. Sensitivity is expressed in µV (microvolts), and a smaller number is

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better (usually). A more useful measurement that you may find only in some reviews is dynamic range. This tells you how well a rig can receive weak signals surrounded by strong ones. Here bigger (numbers) is better.

The Transmitter: On the transmit side, manufacturers offer a number of different circuits to enhance the transmitted quality of voice signals. Preamps, DSP, and audio equalization, to name a few, are typical approaches. Again, the best bet is to test drive the unit before purchasing. For the CW enthusiast, some units offer built-in keyers.

In days past, the transmitter power was rated in terms of input power to final stage. However, changes in FCC rules, along with the availability of inexpensive but highly accurate wattmeters, have resulted in most transmitter specifications listing output power. Assuming a 50 to 60% efficiency, output power is equal to roughly half the input power. Most power ratings are for SSB/CW; FM and AM ratings are usually somewhat lower. Also, there may be some small variation in output power ratings from band to band.

The VHF packet revolution and the introduction of multimode data controllers have resulted in increased interest in HF keyboard modes. Some of these modes, such as RTTY and AMTOR, require the transceiver to transmit continuously. If that is important to you, take note of the transmitter duty cycle. A 50% duty cycle means that the manufacturer is rating the transmitter's performance for transmitting 50% of the time *or less*. This is a non-issue for SSB or CW, but it is very much an issue for RTTY and other continuous-duty modes. For these modes you would have to severely reduce the power level (say to half) to maintain the integrity of the transmitter.

Also, you have the issue of the power supply (built-in or external). A continuous-duty mode puts an extra burden on the power supply. Make sure that it can handle the load if RTTY and AMTOR modes are your intention. Most rigs run off 12 volts, making them ideal for portable and mobile operation. Some of the high-end rigs, though, have final transistors that require 30–40 volts. This makes power-supply requirements more complicated, but the output is more linear. That's a good thing, but is it worth the extra investment?

At the beginning of the article I mentioned a special need if you plan to take a rig mobile (You have to be able to read the display in bright sunlight.). There are some other considerations, too. Obviously, size is one of them. We now have full-power HF rigs that are about the same size as a 2 meter FM box! Operating the controls on rigs this small should be considered before purchasing. An alternative is the larger rigs that have detachable or remotely mounted control heads.

Finally, does the rig you are considering have a built-in antenna tuner? This is one "bell and whistle" item that I like a lot. Move frequency 50 kHz or so and hit the tune button. Boom. Your rig's final transistors are seeing a 1-to-1 match. I like that. The down side is that most built-in tuners are limited to about a 3-to-1 range for matching. Depending on what antennas you are using, you may still need an external tuner.

Next month, we will take a look at buying FM rigs.

73, Pete, WB2D

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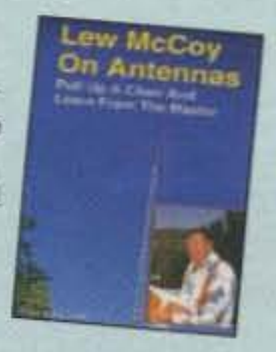

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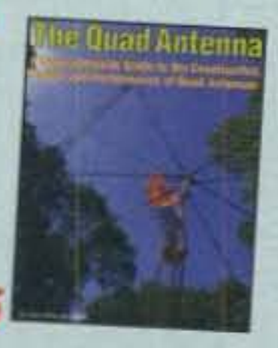

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Contesting

BY JOHN DORR, K1AR

News/Views Of On-The-Air Competition

How To Get A Runner's Edge

October's Contest Tip of the Month

Keep an idea of how well your transmitting equipment is tuned as you move from one part of the band to another. In many cases, antenna SWRs can change dramatically within a given band segment. That, of course, in many cases translates into poorly tuned exciters and amplifiers. For those of you who "pre-mark" your amplifier settings, you may also want to do this more than one time on a given band—especially on 10 meters. Remember, your ability to work guys is largely affected by the amount of RF that leaves your station. Attention to this detail can potentially make a big difference over the course of a contest weekend.

Calendar of Events

Sept. 29	Louisiana QSO Party
Sept. 29-30	Texas QSO Party
Sept. 29-30	**CQ WW RTTY DX Contest**
Oct. 6	European SSB Autumn Sprint
Oct. 6-7	California QSO Party (CQP)
Oct. 6-7	Oceania SSB DX Contest
Oct. 7	RSGB 21/28 MHz SSB Contest
Oct. 10-12	YLRL CW Anniversary Party
Oct. 13	European CW Autumn Sprint
Oct. 13-14	Pennsylvania QSO Party
Oct. 14	North American RTTY Sprint
Oct. 14	RSGB 21/28 MHz CW Contest
Oct. 20-21	JARTS WW RTTY Contest
Oct. 20-21	Rhode Island QSO Party
Oct. 20-21	Worked All Germany Contest
Oct. 21-22	Illinois QSO Party
Oct. 27-28	**CQ WW DX SSB Contest**
Nov. 3-4	Ukrainian DX Contest
Nov. 3-5	ARRL CW Sweepstakes
Nov. 17-19	ARRL SSB Sweepstakes
Nov. 24-25	**CQ WW DX CW Contest**

I'm sure many of you have asked yourself the question "How can I run stations faster in contests, or am I destined to be where I am with no hope for improvement?" Perhaps you wonder if there's some secret decoder ring one can buy at the Dayton Hamvention™ Contest Forum. This month I'm here to bring into the mix some hope and practical advice that with a bit of luck and common sense will help you improve your operating skills—especially in the area of running.

Let's begin with a definition from last month's column. The act of *running* stations in a contest is a method of making contest QSOs that takes place by calling CQ versus tuning the bands and calling stations individually. A common expression is to say, "I had a great run of Europeans this morning."

Reviewing Some of the Basics

While the basic concept of running stations is relatively simple, there are some subtleties that can truly give you an edge in your contest scores. One of the most important considerations in being a good runner in contests is knowing the limitations of your station. While virtually any station can support the ability to run stations (at some reasonable rate, not necessarily 200 QSOs/hour!) at the peak of a band opening—especially on a band such as 10 meters—it's not quite as easy when the going gets tough as competitors move to slug it out on 20 meters. The key is to know when to pick your spots and maximize them during the course of a contest weekend. Also, don't sell your station short by thinking that only the big guns can be the runners in a contest. We all eventually get our 15 minutes of fame (or running, in this case). Yours may only be 15 minutes, but make sure you acquire the experience to know when that could take place and maximize it!

2 Mitchell Pond Road, Windham, NH 03087
e-mail: <K1AR@contesting.com>

It's a Contest, Not *War and Peace*!

Now let's move on to the finer elements of the sport of running stations in contests. One of the secrets I learned early in my contesting career was to call CQ in short bursts, emphasizing the portion of the process that people don't know—your callsign. Leave the long, flowery CQs to Sunday afternoon DXing (or perhaps just leave them altogether), and teach yourself to call CQ in shorter bursts that accentuate your callsign. I would add that shorter bursts do not translate into faster speaking on SSB or sending on CW. I've heard some guys, for example, call CQ, leaving me to scratch my head and ask, "What did they just say?" The key point is to speak briefly and articulately with lots of repetition. Fortunately, voice and CW keyers have made this easy for us in recent decades, so there's really no excuse, right? If you don't have a voice keyer, save your pennies and get one. Not having a voice keyer is like not having cruise control in your car on a cross-country driving trip. Avoiding fatigue is a big part of this game.

It's a Contest—Do You Know Where Your RIT is?

Another important point to make in the game of running is to remember that one little feature on the transceiver you're sitting in front of—the RIT control. This is especially strategic in CW operating. I've seen many operators simply call CQ, hear nobody, and call CQ again only to miss out on a QSO from someone calling slightly above where they're listening. For whatever reason (mostly equipment limitations, I would guess), there truly are a significant number of stations that can't seem to figure out how to call you on your own frequency in a contest.

For that reason and others, the RIT was born. However, a word of caution is in order with this operating tactic: Be careful that the stations you hear are actually calling you and not someone else. Have you ever wondered where those nasty "not in logs" come from in contest log checking? Well, this is certainly one way they are created. Being a little over aggressive with the RIT button can result in the logging of QSOs that were actually made by someone else. So, like most other aspects of contest operating, common sense applies in this case as well.

"Kay One Apple Rhinoceros"

I've covered this one in previous columns over the years, but it bears repeating here. When signing your callsign during a CQ (or any time, for that matter), leave the cute phonetics at the door. Using good old-fashioned military phonetics is the only way to go unless you're sitting in a Field Day tent with a beer in your hand. Anything that requires an answering station to think very long will more than likely make them tune right past you. Also, don't be afraid to mix phonetics around a little bit. The phrase Alpha Radio works pretty well for me, but America Radio isn't bad either.

I Want You to Call Me—Really!

Speaking of the way you talk, one of the important aspects of this subject is how

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you sound when you call CQ. In other words, when you call CQ, do you come across as animated and interested? Does someone tuning by your call hear an interested party who is aggressive, yet not intimidating, or are you just going through the motions? Clearly, voice keyers can help with this, especially in maintaining a level of consistency throughout an entire contest weekend. We all know that our interest level on the Sunday afternoon of a contest rarely approaches where it was at the beginning. The key in a quality CQ sound is to carefully balance aggressiveness against sounding "goofy." It may sound a bit trite to make this point, but focus your CQs on the business at hand and save the job at the recording studio for Monday morning.

"Old Man, Your Audio is Distorted"

When we were young hams (and some of you may be that right now), we used to think that the only way to operate our equipment was to make sure that all the "knobs" were turned completely to the right. I remember my early days of using that old Heathkit HW-16. Boy, the advantage I had running that rig at the full 90 watts with the output knob turned all the way up must have meant all the difference when I became a General class operator (in those days you were limited to 75 watts as a Novice).

In more cases than we perhaps want to admit, operating audio in contest stations leaves something to be desired. Not only does it result in broader signals, it can even create difficulties in intelligibility. Also, with smaller stations there is an even stronger urge to keep things cranked up to compensate for poor antennas or low power. A good tip to remember is for you to be sure to test things out before the contest. While you're testing, get some opinions on the quality of the audio coming out of your voice keyer as well.

In contrast, you can also err on the side of being under-processed. Again, this is a sport of balance that makes your running sound the best it can be, offering the best possibility for other stations to want to stop and call you.

Speed and Your Keyer

What's the right speed at which to set your keyer for a contest run? Unfortunately, the answer is "it depends." Obviously, peak run times will dictate faster speeds than slower times on Sunday afternoon. It's perfectly acceptable to send slower speed CQs when your running rate is down. It's also equally acceptable to mix up your sending speeds in a way that attracts a wider ranger of operators on the other end. Another consideration is required for the band you're using. Clearly, for most of us mortals who have not been blessed with Yagis on 80 and 160 meters, your sending speed, if you CQ much at all, will need to be slower than that of a hot 10 meter opening to Europe.

Final Comments

Hopefully, you picked up a few pointers this month. So much of the sport of contesting seems obvious to the operator who's been at it for 30 years. One of the goals I've been focused on in recent months is to make sure we're bringing the rest of you along. Your feedback to me on other areas of interest to the newcomer to contesting is welcome. As always, the best way to reach me is via e-mail at <K1AR@contesting.com>.

Well, that's all the space and time that I have for this month. As you know, the CQ WW contest season is rapidly coming upon us. Good luck with your last-minute antenna projects. Use this time of year to also think about how much easier things would have been if you'd only started building your dream station in April. I know that I am!

73, John, K1AR

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BY CARL SMITH, N4AA

News Of Communication Around The World

Ham Radio, The Peace Corps, and Butaritari

At my location this summer there has been an excess of rain, far too much lightning, and too little time in between to get much of anything done outside. As a matter of fact, with all of the thunderstorms, there hasn't been a lot of opportunity to even get on the air. I'm just a little "gun-shy," having had two serious attacks by lightning. These days I make sure there is no sign of bad weather conditions before plugging in the gear or connecting coax and control cables. Even with those precautions, a nearby strike this summer managed to destroy my favorite MFJ keyer, a clock/radio, and two cordless phones. Oh, I forgot the modem in my ham shack computer that also got zapped along with my keyer. I just discovered the modem problem last week when I tried to log onto the internet from the shack.

T30ES from Butaritari

I got an e-mail a week or so ago about a young man who had joined the Peace Corps and was going to be spending 18 months on a Pacific island. Let me tell you the rest of this story from Eric Griffin, N1JSY. I hope you find it interesting.

The Bethel Educational Amateur Radio Society, the BEARS, has started over 675 hams on their radio path. Some students become active, in others, the radio seed lies dormant until conditions come together later in life. Eric Griffin, N1JSY was one of those students. After graduating from Penn State, he decided to spend two years with the Peace Corps before entering medical school. During the summer of 2000, he upgraded to a General class operator, hoping that when he received his assignment, amateur radio could be a link to the outside world. He was sent to the island of Butaritari in the Pacific Ocean near Nauru.

The CARA Connection. CARA is the The Candlewood Amateur Radio Association in Connecticut. In support of CARA's mission, as a general-purpose club, a group formed to provide amateur radio support for the little activated island of Butaritari. This project would not only benefit a local ham, in one of the poorest countries on earth, but also the amateur community worldwide. Many CARA members immediately volunteered station equipment: Jim Ritterbusch, KD1YV, an antenna; John Ahle, W1JMA, an antenna and log books; Barry Connolly, KA1JDD, an antenna tuner; and Pete Kemp, KZ1Z, a TS-430 transceiver and a box of ham accessories such as plugs, patch cords, radio books, and hand tools. Eric has made contact with the local authorities on Butaritari and will be assigned the callsign T30ES. Power is limited, with the primary source being solar collectors. Eric has a car battery in his hut which he can charge during the day. Since Eric is new to HF and DXing, CARA members will help him by providing Net Control assistance in the beginning and will act as a QSL manager for this operation.

Operating Schedule: CARA expected T30ES to be operational beginning the first week in September 2001, lasting for approximately 18 months. All T30ES operations will be conducted during non-work hours. Eric is kept busy during the day with a variety of local projects, including developing the country's infrastructure and providing assistance to the people in a number of areas, such as rain-water collection, women's medical issues, and being an advisor to the school's gardening club. He will operate a few hours a day due to limited power resources and will be using two G5RV antennas positioned separately on HF 10 through 80 meters, with a maximum of 100 watts.

QSL Route: CARA is currently investigating methods of transferring log information back to the U.S. in a timely fashion. Please be patient with your QSL card requests. All cards with an SASE will be answered. QSL to W1QI, CARA, P.O. Box 3441, Danbury, CT 06813. Also check out <http://people.mags. net/boem/kiribati1.htm> for operation information and the latest updates.

We keep talking about getting young people involved in ham radio and kicking around various ideas of how to accomplish that goal. It sounds to me as if BEARS, along with CARA, has found at least one answer, and I for one congratulate them both for their efforts to "kill two birds with one stone." Helping the people of Butaritari is certainly a worthwhile effort in itself. Being able to link ham radio with the humanitarian effort through the Peace Corps makes it even better.

J48SAM, IOTA DXpedition to Samothraki Island (IOTA EU-174), June 2001. Ioannis Ioannidis, SV2FPU, and Christos Sfyris, SV2DGH, spent two weeks on Samothraki in early June, making over 8700 QSOs in 142 countries. Before their operation, Samothraki was one of the most wanted islands in Greece. They certainly did their part to reduce that demand. (Photo courtesy Christos, SV2DGH)

Bahri Kacan, TA2BK, Silent Key, July 23, 2001 (Photo courtesy Helmut, DL7MAE)

30 Meter DXCC Award

For a long time there have been grumblings and questions as to why the ARRL wouldn't allow credit for contacts on 30 meters. Well, the questions have been answered. The ARRL Board of Directors voted at their mid-year meeting to revise the DXCC rules to allow for a Single Band award and to add 30

P.O. Box DX, Leicester, NC 28748-0249
e-mail: <n4aa@cq-amateur-radio.com>

The WPX Program

SSB

2808.....EA7OK 2810.....SQ7BCG
2809.....RA9FDR

CW

3074.....W4GP 3076.....EA7OK
3075.....LZ1CY

CW: 700 EA7OK. 800 W4GP, KU6J. 1000 LZ1CY. 1750 I2EAY.

SSB: 500 VE6ZT. 550 EA7OK. 700 VE3NQK. 800 W4GP, KU6J. 1150 I2EAY. 1250 IV3VCG. 1800 W9JDX. 2050 LU5DV.

MIXED: 1000 GØKRL. 1200 W4GP. 2150 I2EAY. 3550 WB2YQH. 5600 F2YT.

10 meters: LZ1CY
20 meters: VE6ZT, LZ1CY, VE3NQK
40 meters: LZ1CY
80 meters: LZ1CY

Asia: LZ1CY
Africa: LZ1CY
No. America: VE6ZT, LZ1CY
So. America: KU6J
Europe: KU6J, VE6ZT, LZ1CY, VE6NQK

Award of Excellence Holders: K6JG, N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GQ, W4BQY, IØJX, WA1JMP KØJN, W4VQ, KF2O, W8CNL, W1JR, F9RM, W5UR, CT1FL, WA4QMQ, W8ILC, VE7DP, K9BG, W1CU, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SMØDJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, I8YRK, SMØAJU, N5TV, W6OUL, WB8ZRL, WA8YM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2QD, ABØP, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POF, DJ4XA, IT9TQH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, KBØG, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1PO, K9LNJ, YB0TK, K9QFR, 9A2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MC, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IV4GME, VE9RJ, WX3N, HB9AUT, KC6X, N6IBP, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, KZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, S53EO, DF7GK, I7PXV, S57J, EA8BM, DL1EY, KØDEQ, KUØA, DJ1YH, OE6CLD, VR2UW, 9A9R, UAØFZ, DJ3JSW, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RAØFU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE, UA3AP, EA5AT, OK1DWC, KX1A, IZ5BAM.

160 Meter Endorsement: K6JG, N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8RSW, W8ILC, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF N4NX, SMØDJZ, DK3AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR1QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N8JV, ONL-4003, W5AWT, KBØG, F6BVB, YU7SF, DF1SD, K7CU, I1POR, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, WBØDD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA5CLV, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, KØDEQ, DJ1YH, OE6CLE, HB9BIN, N1KC, SM5DAC, S51U, RAØFU, UAØFZ, CT4NH, W1CU, EA7TV, LY3BA, RW9SG, K1NU, W1TE, UA3AP, OK1DWC, KX1A, IZ5BAM.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage if airmail desired) to "CQ WPX Awards," P.O. Box 593, Clovis, NM 88101 USA. ***NOTE:*** *WPX will not accept prefixes/calls which have been confirmed by computer-generated electronic means.*

5 Band WAZ

As of August 15, 2001, 565 stations have attained the 200 zone level and 1217 stations have attained the 150 zone level.

New recipients of 5 Band WAZ with all 200 zones confirmed: None

The top contenders for 5 Band WAZ (zones needed, 80 meters):

N4WW, 199 (26)
W4LI, 199 (26)
K7UR, 199 (34)
WØPGI, 199 (26)
W2YY, 199 (26)
VE7AHA, 199 (34)
IK8BQE, 199 (31)
JA2IVK, 199 (34 on 40m)
ABØP, 199 (23)
KL7Y, 199 (34)
NN7X, 199 (34)
IK1AOD, 199 (1)
DF3CB, 199 (1)
F6CPO, 199 (1)
KC7V, 199 (34)
GM3YOR, 199 (31)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W6SR, 199 (37)
W3NO, 199 (26)
K4UTE, 199 (18)
HB9DDZ, 199 (31)
RU3FM, 199 (1)
HB9BGV, 199 (31)
N3UN, 199 (18)
OH2VZ, 199 (31)
K2UU, 199 (26)
W1FZ, 199 (26)
UT4UZ, 199 (6)
SM7BIP, 199 (31)
K4ZW, 199 (23)
W9RPM, 199 (19)
PY5EG, 199 (23)
SP5DVP, 199 (31 on 40)
HC8N, 198 (36 on 80, 39 on 40)
EA5BCX, 198 (27,39)
G3KDB, 198 (1,12)
KG9N, 198 (18,22)
KØSR, 198 (22,23)
UA4PO, 198 (1,2)
JA1DM, 198 (2,40)
9A5I, 198 (1,16)
LA7FD, 198 (3,4)
K5PC, 198 (18,23)
VE3XO, 198 (23,23 on 40)
K4CN, 198 (23,26)
KF2O, 198 (24,26)
W6BCQ, 198 (37,34on40)
G3KMQ, 198 (1, 27)
W5BOS, 198 (18,23)
N2QT, 198 (23,24)
OK1DWC, 198 (6,31)
K7FL, 198 (23,37)
W4UM, 198 (18,23)

The following have qualified for the basic 5 Band WAZ Award: None

Endorsements: None

****Please note: Cost of the 5 Band WAZ Plaque is $80 ($100 if airmail shipping is requested).**

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Paul Blumhardt, K5RT, 2805 Toler Road, Rowlett, TX 75089. The processing fee for the 5BWAZ award is $10.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $15.00 for nonsubscribers. An endorsement fee of $2.00 for subscribers and $5.00 for nonsubscribers is charged for each additional 10 zones confirmed. Please make all checks payable to Paul Blumhardt. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. K5RT may also be reached via e-mail: <k5rt@cq-amateur-radio.com>.

Lee, HL1IWD, a dentist by profession, is an officer of the Korea DX Club and very active on the bands. (Photo courtesy Fred, K3ZO)

meters to the DXCC Challenge Award. It is expected that this change will be implemented in the third or fourth quarter of 2002.

Logbook of the World

Following the ARRL Board's approval of the Logbook of the World (LOTW) at their annual meeting, ARRL Membership Services Manager and LOTW Project Manager Wayne Mills, N7NG, said the ARRL hopes soon to make LOTW software modules available to vendors for incorporation into their logging programs. These modules are being developed as part of the Trusted QSL open-source project headed by Darryl Wagoner, WA1GON.

"We have been in touch with 15 or so developers of popular logging software," Mills said. "We're also looking at providing a basic, do-it-yourself program to get contact data to ARRL."

At the heart of the Logbook of the World concept is a huge repository of log data to be provided by operators, from individual DXers and contesters to major DXpeditions, and maintained by the ARRL. Mills says the system will benefit big and little guns alike by providing quick QSO credit for awards offered by the ARRL, and, it is hoped, for awards offered by other organizations as well.

Once it becomes available, which could be as early as the middle of next year, Logbook of the World will accept authenticated data directly from computerized logs via the internet. "This is an e-mail based system that uses easy-to-obtain digital signatures for authentication," Mills said. "Once you get your digital certificate, a few keystrokes will do the trick."

Mills said the program envisions user access to the LOTW "confirmed database" so an operator can see what "matches" turn up, such as confirmation of new DXCC entities, states, or grid squares.

"We'll also publish a list of logs that have been submitted," he said, adding that operators may access the LOTW database once they've uploaded their own log data.

Heading up software development is ARRL Electronic Publications Manager Jon Bloom, KE3Z, along with Web Applications Developer, Mark Simcik, WA1VVB. Software specifications have already been established. Advising the project are Darryl Wagoner, WA1GON; Dick Green, WC1M; and Ted Demopoulos, KR1G. ARRL staffer and well-known contester and DXer Dave Patton, NT1N, who conducted the original electronic QSL project study, is also assisting. Mills said that he hopes to be able to announce a specific inauguration date for Logbook of the World with-

THE WPX HONOR ROLL

The WPX Honor Roll is based on the current confirmed prefixes which are submitted by separate application in strict conformance with the CQ Master Prefix list. Scores are based on the current prefix total, regardless of an operator's all-time count. Honor Roll must be updated annually by addition to, or confirmation of, present total. If no up-date, files will be made inactive.

MIXED

5054 9A2AA	3734 VE3XN	3118 W9HA	2903 KF2O	2597 HA5NK	2291 K5UR	1916 DJ1YH	1496 KØKG	1236 EA2BNU
4363 W2FXA	3624 9A2NA	3091 WA8YTM	2853 KØDEQ	2469 YU7GMN	2170 W4UW	1877 OZ1ACB	1436 N1KC	1199 KU6J
4095 F2YT	3606 N4MM	3084 I2MQP	2849 4N7ZZ	2464 K2XF	2093 W7OM	1745 AA1KS	1429 W2EZ	1165 KX1A
4086 K6JG	3573 N9AF	3060 WB2YQH	2835 W2WC	2455 N6JM	2028 WB3DNA	1716 Z35M	1418 WT3W	1147 W2CF
4034 W1CU	3523 SM3EVR	3029 YU7BCD	2831 IT9QDS	2424 W9IL	2019 HA9PP	1670 W7CB	1408 NG9L	1082 OK1DWC
3960 EA2IA	3513 I2PJA	3027 YU7SF	2899 JH8BOE	2380 9A4W	2012 JN3SAC	1651 I1-21171	1337 VE6BMX	1040 PY1NEW
3846 N4NO	3465 N5JR	3026 K9BG	2798 IK2ILH	2372 S58MU	1989 CT1EEB	1613 YU1ZD	1343 VE6FR	1006 K6UXO
3772 UA3FT	3458 YU1AB	2970 S53EO	2773 W2ME	2314 W6OUL	1939 PY2DBU	1572 VE6BF	1295 VE9FX	937 N3KR
3762 N6JV	3144 PAØSNG	2945 I2EOW	2743 HAØIT	2305 W8UMR	1926 I2EAY			

SSB

4306 IØZV	2980 N4NO	2500 4X6DK	1989 CT1EEB	1667 KS4S	1568 CT1BWW	1311 KC6X	1130 I2EAY	812 KU6J
4128 VE1YX	2968 EA8AKN	2488 I8KCI	1972 W4UW	1655 K5IID	1545 SV3AQR	1287 KI7AO	1111 EA3KB	783 VE6BMX
3845 ZL3NS	2902 I2MQP	2412 WA8YTM	1950 K5UR	1643 W6OUL	1532 DF7HX	1273 NG9L	1092 N1KC	781 N3DRO
3784 K6JG	2900 N5JR	2404 KF7RU	1945 LU5DV	1631 HA5NK	1525 IKØEIM	1239 LU4DA	1070 JN3SAC	717 F5RRS
3547 F6DZU	2888 I4CSP	2381 YU7BCD	1860 N6FX	1631 K3IXD	1514 W2ME	1222 LU3HBO	1064 NH6T	716 KX1A
3503 I2PJA	2877 9A2NA	2333 W2WC	1860 K2XF	1626 W7OM	1493 IK2AEQ	1192 K4CN	1051 EA3EQT	680 OK1DWC
3172 CT4NH	2758 PAØSNG	2332 CX6BZ	1748 YU7SF	1617 I3ZSX	1427 N3XX	1165 EA5DCL	1005 DL8AAV	652 F5LIW
3168 N4MM	2706 I2EOW	2325 EA1JG	1717 W9IL	1599 DK5WQ	1421 W2FKF	1154 WT3W	990 HA9PP	634 F5UTE
3097 OZ5EV	2672 CT1AHU	2202 IN3QCI	1707 I8LEL	1591 IT9SVJ	1410 T30JH	1141 IKØJMS	982 AG4W	609 VE7SMP
3056 EA2IA	2515 LU8ESU	2038 OE2EGL	1698 EA7TV	1585 K8NDU	1385 I3UBL	1138 VE9FX	972 AI6Z	605 KE4SCY
2995 F2VX	2515 EA5AT	2033 HAØIT						

CW

4129 WA2HZR	3005 EA2IA	2396 WA8YTM	2000 OZ5UR	1762 W6OUL	1488 VE6BF	1339 LU3DS	1060 W4UW	832 WT3W
3734 N6JV	2699 LZ1XL	2238 W2WC	1996 G4SSH	1744 IK3GER	1485 9A3SM	1310 I2EOW	1034 WO3Z	814 KU6J
3399 N4NO	2589 N5JR	2238 JA9CWJ	1946 I7PXV	1706 JN3SAC	1480 IK5TSS	1268 4X6DK	987 K6UXO	750 KX1A
3365 VE7CNE	2566 9A2NA	2198 EA7AZA	1946 LU2YA	1620 I2EAY	1466 IK2ECP	1248 AC5K	935 VE6BMX	732 AI9L
3353 K6JG	2548 N4MM	2184 KA7T	1923 K2XF	1590 EA7AAW	1452 EA6AA	1154 LU7EAR	926 PY4WS	732 N1KC
3043 K9QVB	2534 W2ME	2105 G3VQO	1855 K5UR	1572 W9IL	1390 I2MQP	1150 DF6SW	898 JK1AJX	612 F5RRS
3021 YU7LS	2437 YU7BCD	2016 N6FX	1779 IT9VDQ	1546 W7OM	1340 EA2CIN	1121 EA2BNU	862 WA2VQV	604 EA5DCL

The WAZ Program

All Band WAZ

SSB

4682 JE6TSP	4687 IV3TES
4683 AF4MI	4688 KA9GME
4684 N6DXC	4689 W2SN
4685 DS3EXX	4690 JA8GTO
4686 DL7APK	

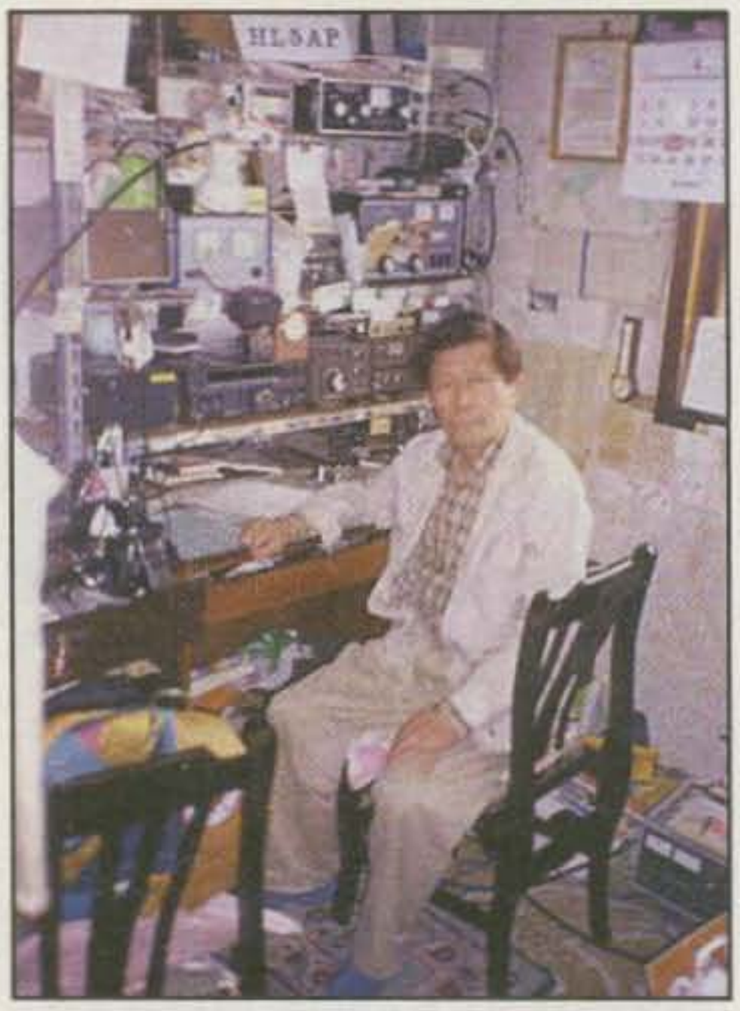
Mixed

8069 DS3CHH	8073 W7BX
8070 JI7KEP	8074 JA1GQV
8071 IK6EIW	8075 JA1FY
8072 W3DRY	8076 K4VX

All CW

265 K4VX	269 JG3LGD
266 W1ZT	270 JE6TSP
267 KB1ALE	271 SM6CK
268 SV1AIP	

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Paul Blumhardt, K5RT, 2805 Toler Road, Rowlett, TX 75089. The processing fee for all *CQ* awards is $6.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $12.00 for nonsubscribers. Please make all checks payable to Paul Blumhardt. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. K5RT may also be reached via e-mail: <k5rt@cq-amateur-radio.com>.



One of Korea's veteran hams, Cho, HL5AP, has retired to this shack after his many years as a shipboard radio operator. (Photo courtesy Fred, K3ZO)

in a few months, as the software design progresses.

New Checkpoint in Spain

There is a new checkpoint for the *CQ* awards in Spain: Joan Pons Marroquin, EA3GEG, has taken over the position from Jaime Vallvey Reyes, EA3AJW. We thank EA3AJW for his efforts over the years and welcome EA3GEG to the ranks of *CQ* checkpoints.

Bahri Kacan, TA2BK (SK)

On July 23, 2001 Bahri Kacan, TA2BK, suffered a heart attack and became a Silent Key. Bahri, who worked for the Bosch company, was a well-known DX-er in Germany as well as Turkey. He

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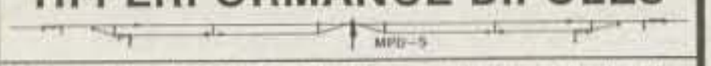
HI-PERFORMANCE DIPOLES



Antennas that work! Custom assembled to your center freq. ea. band - advise ht. of center and each end - hang as inverted "V" - horizontal, vert dipole, sloping dipole - commercial quality - stainless hardware - legal power - no-trap, high-efficiency design. Personal check, MO or C.O.D. ($3)

MPD-5*	80-40-20-15-10M Max-Performance Dipole, 87' or 78' long	= $125
MPD-2*	80-40M Max-Performance Dipole, 85' long=$77, 105' long	= $80
MPD-3712	30-17-12M Max-Performance Dipole, 31 ft. long	=$80
HPD-3*	160-80-40M Hi-Performance Dipole, select 113 ft. or 125 ft	= $95
SSD-6	160-80-40-20-15-10M Space-Saver Dipole, 71 ft. long	=$179
SSD-5*	80-40-20-15-10M...42' ft. long = $125 60' ft. long	=$130

*Times 9-Bands with Wide-Matching-Range-Tuner. S&H PER ANTENNA=$7.00

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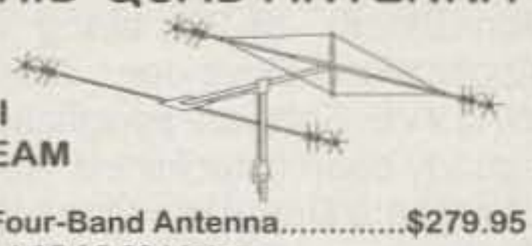
HYBRID-QUAD ANTENNA



MINI HF BEAM

MQ-1 Four-Band Antenna.....$279.95
6,10,15,20 Meters
MQ-2 Six-Band Antenna.....$369.95
6,10,12,15,17,20 Meters
Shipping charges extra.

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Tel. & Fax (519) 271-5928
http://www3.sympatico.ca/tgmc/index.html

A few of those who attended the dedication of the Southern Appalachian Radio Museum, Inc. in Asheville, North Carolina on July 27, 2001. Harry Mills, K4HU, talks with John Travis, W4QCF; Borden Sabiston, K7DXF; and Bob Wilson, KN4AU. QCWA Chapter #145 in Asheville is the driving force behind this effort, and its members welcome your inquiries via N4AA, the Chapter and Museum President. (Photo courtesy John, W4QCF)

CQ DX Awards Program

SSB

2347 .....IN3DEI
2348 .....WB5SYT
2349.....EA3BMT

CW

1021 .....EA1EXE
1022 .....N1KC

SSB Endorsements

320.....VE3XN/333
320.....W2JZK/333
320.....IN3DEI/333
320 .....EA4DO/333
320.....OE7SEL/3338
320 .....W4UW/332
320 .....K9PP/332
320.....K4CN/332
320.....CT1EEB/332
320 .....VE3GHZ/330
320 .....KB2MY/328
320.....WØULU/320
320 .....N1KC/305
275.....I3ZSX/290
150.....WB5SYT/166
28 MHz OK1DWC
3.5/7 MHz OK1DWC

CW Endorsements

320.....K4CN/332
320.....VE3XN/331
320 .....W4UW/324
275.....N1KC/276
28 MHz OK1DWC
3.5/7 MHz OK1DWC

The basic award fee for subscribers to *CQ* is $6. For non-subscribers, it is $12. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00 each plus SASE. Updates not involving the issuance of a sticker are free. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business-size, No. 10, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. Currently we recognize 333 active countries. Please make all checks payable to the award manager.

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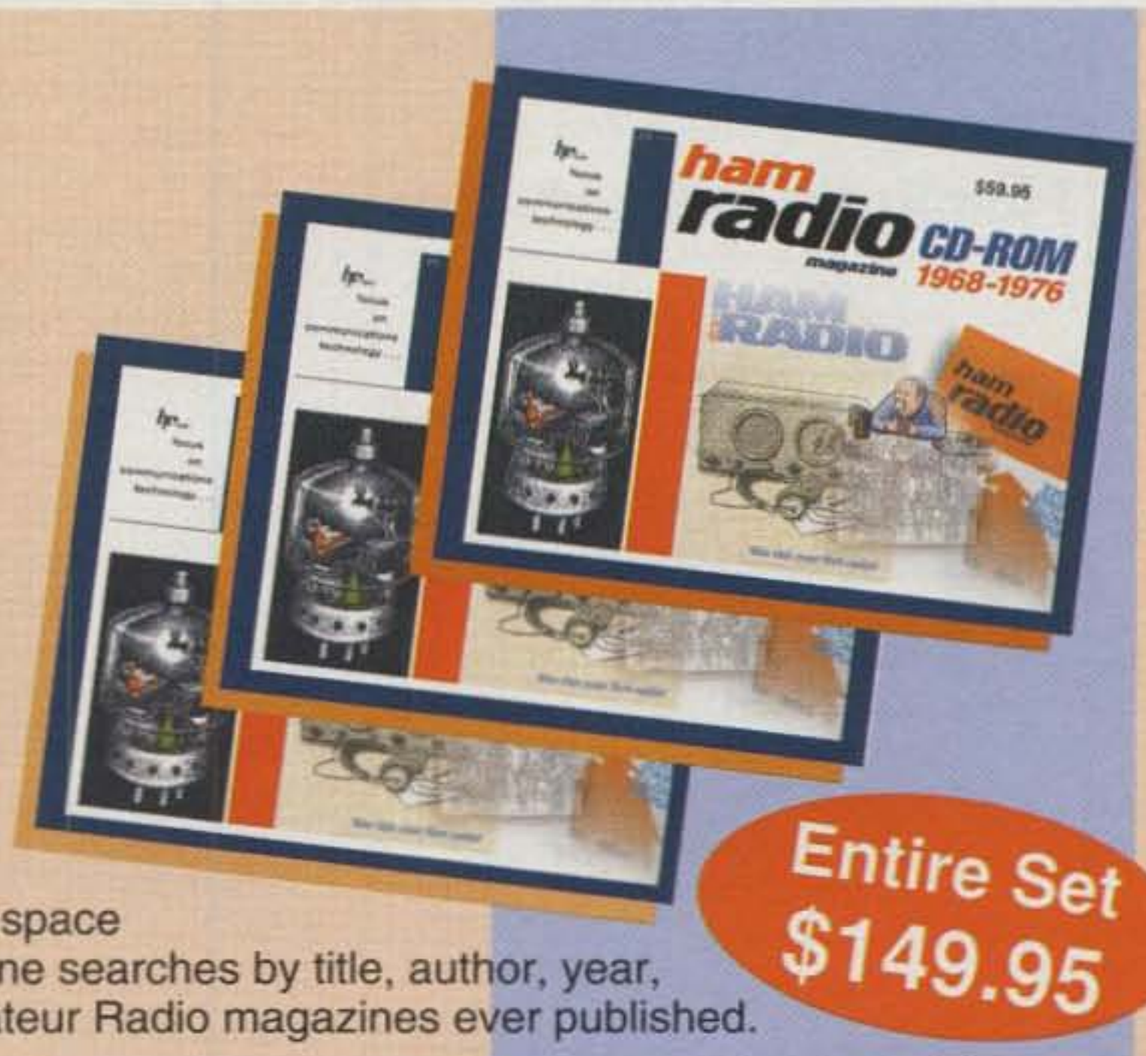

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KD1OS/KHØ to JJ1CRV
KHØA to JF1MIA
LU1IV to W3HNK
LX9SW to PA1KW
LYØHQ to LY1DR
NHØS to JF2SKV
OHØYLS to OH1MK
OJØ/AH7X to JP1NWZ
OS4OSA to ON7SS
OX/SP8UFO to SP8TK
P29IO to VK3IO
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PX2I to PY2TNT
S21YV to KX7YT
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SM5/GØGRC to GØRCI
SNØDO to SP1ZIE
SO1RON to DL2RON
ST2SA to DJ9ZB
T30ED to 3D2SJ
T30XU to PA3AXU
T48Z to IN3ZNR
T88BB to JE8BKW
T88EM to DL7ADL
T98MHA to DL2MHA
TF8GX to K1WY
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(The table of QSL Managers is courtesy of John Shelton, K1XN, editor of "The Go List," P.O. Box 3071, Paris, TN 38242; phone 901-641-0109; e-mail: <golist@wk.net>.)

was a past president of the Turkish Radio Amateur Association (TRAC).

A native of Yugoslavia, Bahri got his start in amateur radio in 1956 at the YU1BKL club station in Belgrade. When he moved to Turkey, he became one of the founders of TRAC in 1962. Although Bahri had used the TA2BK callsign for many years, the Turkish government did not formally recognize ham radio until 1984. In the mid-1980s he worked to translate the German, U.S., and British regulations for amateur radio, which eventually resulted in "legalizing" amateur radio in Turkey. Prior to that, Turkey tolerated the low-profile operation of the handful of die-hard enthusiasts.

Helmut, DL7MAE, told me that when Bahri lived in Munich he was his DXing Elmer and taught him a lot of "secrets." Also, Bahri was one of the founders of the Bavarian Contest Club in 1984.

In 1970 and 1971 Bahri was a part of the ZA2RPS DXpedition which made Albania available to the DX community for the first time. He was a guest operator at 4U1ITU, and during the World Radiocommunication Conference 2000 in Istanbul, he helped organize the TA1ITU special event station which operated during the conference.

Bahri achieved Number 1 – Honor Roll as DJØUJ. After returning to Turkey in the 1990s, he achieved Honor Roll status as TA2BK.

The sudden passing of Bahri was a shock to his many of his German friends and to the DXing community. Leaders such Bahri, TA2BK, come along all too seldom, and his loss will be felt throughout the amateur communities of many nations. Our condolences to his family, and his friends throughout the world.

Wrap Up

The questions about QSLing I raised in the last few months have generated some comments, but not an overwhelming amount. Perhaps most folks are reasonably satisfied with QSLing as it is today. What's that famous old saying? "You can't please all of the people all of the time. . . ."

I hope you had an enjoyable summer, or winter as the case may be, and are now ready for the contest season and all that good DX that comes with the changing weather. Lower noise levels on 40, 80, and 160 will certainly be welcome. Until next time ... Good DXing.

73, Carl, N4AA

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Awards

BY TED MELINOSKY, K1BV

News Of Certificate And Award Collecting

Yasutada Ninomiya, JH8GWW, USA-CA #1024, the first Japanese station to complete USA-CA All Counties.

This month we start with a profile of Yasutada Ninomiya, JH8GWW, USA-CA All Counties #1024, June 1, 2001. He is the first station in Japan to complete USA-CA.

I was born in Hokkaido (JA8 area) on January 4, 1930. I was first licensed as JF1MHC in Tokyo (10 watts phone), but I did not get into county hunting until I came back to my home town of Sapporo. Most of my QSOs were for DXCC on 10 meters with a 6-element monoband Yagi.

In 1982, working 500 counties on 10 meters SSB, not to mention working them all, seemed to be an unreachable goal. Many thanks to my old friends KB7QO, WA7UQE, KB5FU, N9DEH, WØDSY and WØOWY, WA3TUC, W4RKV, N7AKT, KK7X, and KBØGZR for helping me get to 500. In 1984 I earned a higher class license, allowing 200 watts on 20 meters. I reached the 1000 counties level in 1985, then 2000 in 1987 and 2500 in 1988.

I came back to Sapporo again in 1992 and checked into the 14.336 MHz net every day. It seemed to me that the North Pole path to the U.S. was not good compared to propagation into Europe. Then I met Alan, VK4AAR, on the net and I learned that I could contact mobiles via VK stations, like a triangle QSO. VK4AAR, VK6NZ, VK4SJ, and VK3CB helped me many times after the 2500 counties mark.

On November 1, 1999 I bought my current HF rig, a JRC JST-245H (150 watts) because this rig has an RF amplifier switch and it is easy to hear weak signals. My antenna is a 5-element monoband Yagi up about 20 meters.

As of January 1, 2001 I needed 39 counties to have worked them all. I never thought I would do it in such a short time. K3RV sent me an e-mail about the W6EL software for propagation predictions, and it was very useful. Ken, KC4UG, gave me six counties in Mississippi in a three-day run, and Gene, N4ANV, gave me 13 of the last 25 counties. I finished USA-CA All Counties by working WØDFK in Warren, Tennessee on May 6.

Many thanks to the following for making special trips for me: KB5WY, K5XY, N8ELQ, AA1JJ, K4QFK, N4NX, N8OYY, WB4FFV, KC3X, KC4UG, WØDFK, N4ANV, and W3CR. Also, my special thanks to my friend Fred, K5CWR. It was marvelous the way he organized the mobiles to work with me. I could not have accomplished All Counties without the help of all those who went out of their way for me and who helped with relays when the propagation was bad. What an exciting USA-CA award! *—Yas, JH8GWW*

65 Glebe Road, Spofford, NH 03462-4411
e-mail: <k1bv@cq-amateur-radio.com>

USA-CA Special Honor Roll

Nancy Nosker, WØNAN
USA-CA All Counties #1026
June 30, 2001

Herb Rode, KE7PB
USA-CA All Counties #1027
July 16, 2001

USA-CA Honor Roll

500
LA5ZC 3166

1500
WØNAN 1317

2000
WØNAN 1217

2500
WØNAN 1138
KE7PB.....1139

3000
WØNAN 1045
KE7PB.....1046

The total number of counties for credit for the United States of America Counties Award is 3076. The basic award fee for subscribers is $6.00. For nonsubscribers it is $12.00. To qualify for the special subscriber rate, please send a recent CQ mailing label with your application. Initial application may be submitted in the USA-CA Record Book, which may be obtained from CQ Magazine, 25 Newbridge Road, Hicksville, NY 11801 USA for $2.50, or by a PC-printed computer listing which is in alphabetical order by state and county within the state. To be eligible for the USA-CA Award, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated June 1, 2000. A complete copy of the rules may be obtained by sending an SASE to Ted Melinosky, K1BV, 65 Glebe Road, Spofford, NH 03462-4411 USA. DX stations must include extra postage for airmail reply.

Awards Available

The Czech Republic AMA Magazine Award Series. The Czech county award is a pretty challenging one, requiring contacts with 70 of the 86 counties of the small country. For those of us who have a foot-high pile of OK QSLs dating back to the 1960s, only contacts since 1 January 1993 may be used. However, this is not a rare country, and there are plenty of chances to work large numbers of Czech stations in contests. The Praha (Prague) Award is a subset of the OK Counties Award and requires working eight of the ten regions of that city.

General Requirements: Both of the awards are full-color, well-designed, and worth the effort to earn. Apply with GCR and fee of $US5 or 8 IRCs to: Award Manager, Karel Karmasin OK2FD, Gen. Svobody 636, 67401 Trebic, Czech Republic.

OK Counties Award. This award is issued for contacts with different OK counties after 1 January 1993. The basic award is for 70 counties using mixed modes, any bands. Stickers are only issued for CW, phone, or VHF contacts (on VHF only 50 counties are needed). There is a special class for all 86 counties. Each county has a three-letter abbreviation used as an exchange in the annual OK DX Contest.

Praha Award. Contact at least eight of the ten official regions of Prague since 1 January 1993 using any band or mode. Endorsements are issued for all CW, phone, or VHF/UHF. (On VHF/UHF, only five regions are needed). There is a special class for all ten regions. The regions are noted as APA (Praha #1) to APJ (Praha #10) as sent during the OK DX Contest.

The Czech OK Counties Award requires contacts with 70 of the 86 counties of the country.

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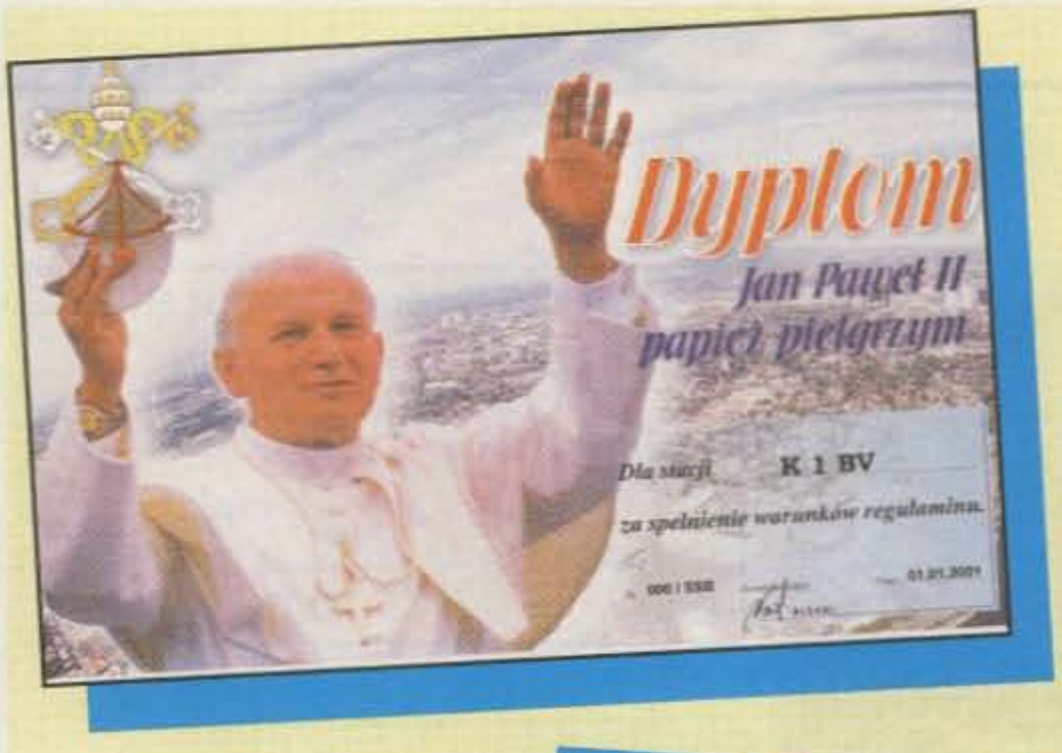

The Pilgrim Pope Award commemorates the many pilgrimages of Pope John Paul II.

This award is given in various levels for contacting Spanish islands.

The Stars and Stripes Island Award program is based on contacts made with islands of the U.S.

Poland's John Paul II, Pilgrim Pope Award. Pope John Paul II has traveled to at least 114 different DXCC countries during his reign as the leader of the Catholic Church. The award commemorates his many pilgrimages. It should not be difficult to earn, as it only requires that the applicant work 20 of these countries since 16 October 1978 using any band or mode. If you include contacts with special stations established on the occasion of his visit, each one of these is worth five of the required countries. Each country may be worked only once. One Polish contact is mandatory. SWL okay. The prefixes of valid countries are shown below.

Send GCR list and fee of $US7, DM10, or 7 IRCs to: Wlodzimierz Nawrot, DL3KDC, Erzbergerallee 86, D-52066 Aachen, Germany. The sponsor will contribute any excess monies collected to the medical care of children in Poland.

Valid country prefixes: A2, AP, C5, C9, CE, CN, CO, CP, CT, CX, D2, D4, DL, DU, EA, EI, ES, F, G, H4, HA, HB9, HBØ, HC, HH, HI, HK, HL, HP, HR, HS, I, J5, J6, JA, K, KH,2 KL7, KP4, LA, LU, LX, LY, OA, OD, OE, OH, OK, OM, ON, OZ, P2, PA, PY, S2, S5, S7, S9, SM, SP, T7,

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Spanish Islands Award. This award is designed to promote interest in and expeditions to Spanish islands. It is available for contacting Spanish islands since 1 January 1988. SWL and satellite contacts are okay.

Basic Award: Contact different Spanish Islands depending on your WAZ zone. EA's need 25 points. Stations in zones 14–16, 20, and 33 need 20 points. Stations in zones 5–13, 17, 21, 34–37, and 40 need 12 points. All other zones need 8 points. Endorsements for every 5 new points; endorsements are free, but you should provide SASE/IRC.

Silver Award: As above, but the points must be earned on each of the following bands: 28, 21, 14, 7, and 3.5 MHz (for example, EA's need 25 points times 5 bands = 125).

Golden Award: Same as the Silver Award, but requires the five HF bands plus 18 and 24 MHz (for example, EA's need 25 points × 7 bands = 175 points).

The fee schedule is as follows:

Basic ceramic statue: Spanish stations stations 5000 Pt., endorsement 400 Pt.; foreign stations US$70 (or 140 IRCs), endorsement US$6 (12 IRCs).

Basic paper award: Spanish stations 1000 Pt., endorsement no charge; foreign stations US$12 (24 IRCs), endorsement no charge.

A complete Spanish islands listing may be found at: <http://usuarios.tripod.es/die/>. Click on the link shown as "Listado de Islas DIE." It's one large file, so be patient as it downloads.

Apply to: URE, P.O. Box 75, 46400 Culleron (Valencia), Spain.

USA Stars and Stripes Island Awards Program. Here's another major U.S. islands program, and according to Michael Crownover, AB5EA, its scope is more clearly defined using island listings as defined in a U.S. Geological Survey publication. Michael has a pretty good website with rules and a display of island lists by state. This is just another indication of the growth of interest in the island awards in a large number of countries in the past several years. Few of us can travel to some exotic DX island, but many of us live not too far from some "rare" islands.

Work 100 different islands based on an island list compiled by the U.S. Geological Survey (USGS). The USGS list should be considered complete, although it is possible that a few groups maybe added in the future. There are no time restrictions. Any QSL card that has the name of an island found in the USGS list for this award will be given credit for that particular SSIA Island group. Endorsements are available for each additional 50 islands and for islands in all 50 states.

A second award is available which provides endorsements consisting of state-flag stickers you place on the award. You earn each such endorsement by providing proof of having confirmed contacts with at least 75% of the island groups in that particular state.

The QSL cards should have the name of the island and county where the island is located clearly printed on the card. A QSL card without a county name will only be accepted if the island operator informs the award manager of his location. E-QSL cards will be accepted for the award. However, only cards from the eqsl.cc service will be accepted. All cards must be submitted to the award checkpoint. All operations must take place from the island and the antenna must be on the island. All rules and regulations regarding access to any island should be followed. The individual must provide all necessary documents to the award committee where it is warranted.

The internet website for this award, including official island lists and an application, is <http://www.qsl.net/ab5eb/ssia/>.Send official application and fee of US$10 to Michael Crownover, 3617 Avenue O 1/2, Galveston, TX 77550.

Corrections

The April column featured the Appalachian Trail Award. Note that all contacts must be made on or after January 1, 2000. In the July column the correct requirement for the Canadian Fiddlehead Award is 10 contacts within the province of New Brunswick rather than 10 from the city of Fredericton.

URL of the Month

Continuing the theme of island awards to this final part of the column, there's a great list of links found at: <http://www.iota-post.de/islww/hauptteil_islww.html>. Major U.S. island awards are shown, as are awards from a dozen other countries.

Please continue to send in award samples and rules for your club or group. Publicity is a key ingredient for award success, and if you'll take the first step, I'll see what I can do to get you that valuable exposure.

73, Ted, K1BV

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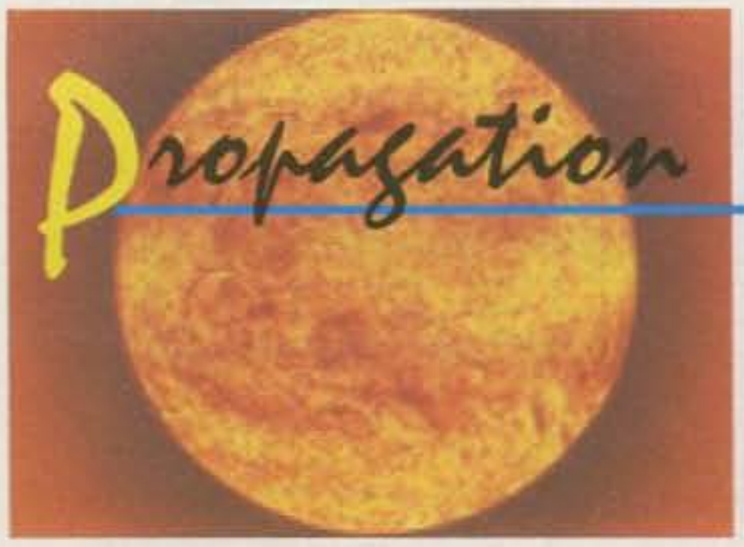

BY GEORGE JACOBS, W3ASK

The Science Of Predicting Radio Conditions

High Sunspot Count Continues for 2001 CQ WW DX Contest

While the peak of sunspot Cycle 23 has passed, it is declining at a very slow rate. The cycle is expected to remain high enough during the 2001 CQ World-Wide DX Contest weekends to support near record-breaking, if not record-breaking, scores, provided radio storminess does not occur.

The 2001 CQ WW DX Contest will be held on the following dates:

SSB: 0000 UTC, Sat., Oct. 27 to
2400 UTC, Sun., Oct. 28
CW: 0000 UTC, Sat., Nov. 24 to
2400 UTC, Sun., Nov. 25

Table I compares observed sunspot levels during previous WW DX contest period since 1990, and the level predicted for the 2001 contest. There is a very good chance that the great HF propagation conditions of last year may repeat again this year, since sunspot counts have dropped very slowly since the 2000 contest period.

The 2001 CQ WW DX Contest represents another major event for me personally. This is the 51st consecutive special forecast I have written for the CQ WW Contest weekends. I wrote my first one for the 1951 contest and haven't missed one since. The accuracy of the previous 50 contest predictions exceeds 96%!

If you plan to participate in the 2001 contest, the DX Propagation Charts and other information appearing in this month's column are designed to help you stay sharp and informed, and to make the best use of the ionosphere for piling up as many contacts and points as possible.

SSB Contest: High to Low Normal Conditions Expected

This column is being written in early August, three 27/28-day solar rotation cycles away from the start of the WW DX SSB Contest weekend. The best tool available for predicting day-to-day HF propagation conditions so far in advance is the 27/28-day recurrence tendencies of geomagnetic, solar, and ionospheric conditions. While this is far from an absolute method of prediction, it often does give an indication of what to expect.

Based on a study of solar, geomagnetic, and ionospheric patterns expected during the next three rotational periods of the sun, it looks as if conditions for the contest on October 27 will likely be mainly High Normal, possibly increasing to Above Normal at times for mid and low latitude openings.

Variable conditions are expected on October 28. The day may begin with High Normal conditions, but drop to Low Normal towards the end of the contest when a radio storm may develop, dropping conditions to Below Normal on paths that pass through the auroral zones.

Predictions for one 27/28 day rotational period are far more accurate than for a three rotational period. Be sure to carefully check conditions on September 29 and 30, since this would be one rotational period before the SSB contest weekend of October 27–28. There is a better than 90% chance that conditions observed on those days will recur during the contest weekend.

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LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for October 2001

Propagation Index.....	Expected Signal Quality (4)	(3)	(2)	(1)
Above Normal: 5, 12-13, 20-21	A	A	B	C
High Normal: 3-4, 11, 14, 19, 22, 25, 27, 31	A	B	C	C-D
Low Normal: 1-2, 6-7, 10, 15-16, 18, 24, 26, 28, 30	B	C-B	C-D	D-E
Below Normal: 8-9, 17, 29	C	C-D	D-E	E
Disturbed: 23	C-D	D	E	E

Where expected signal quality is:

A—Excellent opening, exceptionally strong, steady signals greater than S9.

B—Good opening, moderately strong signals varying between S6 and S9+, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S9, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S6, with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find the *propagation index* associated with the particular path opening from the Propagation Charts appearing on the following pages.

2. With the *propagation index*, use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 3 will be fair-to-good (C-B) on Oct. 1–2, good (B) on the 3rd and 4th, excellent (A) on the 5th, etc. During the SSB CQ WW DX Contest weekend good (B) conditions are expected on Oct. 27th, with the 28th expected to be fair-to-good (C-B).

See the "Last-Minute Forecast" box for additional information concerning expected day-to-day conditions for the entire month of October. An updated day-to-day forecast for the SSB contest weekend will appear as a bulletin at the beginning of next month's column. The November issue of *CQ* should reach most subscribers before the SSB contest begins.

Solar Cycle Progress

Dr. Pierre Cugnon of the Royal Observatory of Belgium, the official keeper of sunspot records, reports a monthly smoothed sunspot number of 134 for June 2001. A high count of 191 was reported for June 16, while a low of 58 occurred on June1.

June's mean value results in a 12-month running smoothed sunspot number of 112 centered on December 2000. This is a drop in one number from the previous month. The National Geophysical Data Center, Boulder, Colorado, is calling for a smoothed sunspot number of approximately 106 for October 2001, as the cycle is expected to continue its slow decline.

Canada's Dominion Radio Astrophysical Observatory reports a corresponding 10.7 cm solar flux level of 179 for June 2001. This results in a smoothed value of 172 centered on December 2000. A smoothed solar flux on the order of 169 is forecast for October.

General Conditions, Band by Band

Following is a band-by-band summary of DX propagation conditions expected from mid-October through mid-December 2001 and centered on the WW DX Contest period. For a more detailed circuit-by-circuit analysis, refer to the DX Propagation Charts that appear on the following pages.

10 meters: Good openings should be possible to most areas of the world during the daylight hours, and the band may remain open to southern and tropical areas into the early evening. DX openings should begin an hour or so after sunrise toward Europe, Africa, and the east, as well as in a southerly direction toward Europe, Africa, and the east, as well as in a southerly direction toward the Caribbean and Central and South America. Signals should peak in intensity toward

	1990	'91	'92	'93	'94	'95	'96	'97	'98	'99	'00	'01
October	142	142	76	45	27	12	9	32	71	108	115	106*
November	142	138	74	41	26	11	10	35	73	111	113	105*

Table I– Smoothed sunspot numbers recorded during CQ World-Wide DX Contests (October SSB, November CW) since 1990.
** Predicted values expected during the 2001 contest.*

Europe and the east an hour before noon, toward Africa about an hour or so after noon, and toward the south during the late afternoon. Optimum conditions toward the Far East, Australasia, Southeast Asia, etc., are forecast for the late afternoon and early evening hours. Exceptionally strong signal levels can be expected on many openings, particularly when conditions rise to High or Above Normal.

15 meters: This band should be jumping during most of the daylight hours. Excellent propagation conditions are expected from shortly after sunrise through the early evening hours. The band could remain open into the evening toward southern and tropical areas. Peak openings should occur toward a specific geographical area about an hour or so after the peak has occurred to the same area on 10 meters. Openings are expected to all areas of the world, and exceptionally strong signals should be possible most of the time. Fifteen meters is likely the best DX band during the daytime hours.

20 meters: Expect good-to-excellent DX openings almost around the clock. Signals should peak from all directions for about an hour or two after sunrise and again during the late afternoon and early evening. Excellent openings are expected to many southern and tropical areas well into the hours of darkness. Expect long-path openings on this band for about an hour or so after sunrise and again for an hour or so before local sunset. Signal levels are expected to be exceptionally strong during peak propagation periods on 20 meters. This should be the band that will produce the longest period for DX openings, the strongest signals, and openings to more areas of the world than any other single band during the contest periods.

40 meters: This should be a prime DX band during the hours of darkness as summer static fades into oblivion. DX openings should begin during late afternoon, continue throughout the hours of darkness, and last until an hour or two after sunrise. The band should open first for DX toward Europe and the east during the late afternoon. Signals should increase in intensity as darkness approaches. During the hours of darkness expect good DX openings to most areas of the world. Signals should peak from an easterly direction about midnight, and from a westerly direction just after sunrise. Excellent openings toward the south should be possible throughout most of the nighttime period. Forty meters is likely to be the best band for DX during the hours of darkness.

80 meters: While not quite as good a nighttime band as 40 meters, expect some good DX openings on this band to many areas of the world during the hours of darkness. The band will open later, close earlier, and be somewhat noisier than 40 meters. Signals should peak toward Europe and the east around midnight, and toward the west just before sunrise. Expect good openings toward the south throughout most of the night.

160 meters: Considerably decreased static levels and longer hours of darkness in the Northern Hemisphere should welcome back DX openings on this band during the hours of darkness and into the sunrise period. Because of relatively high signal absorption and the lower power levels used on this band, openings will often be weak and noisy, but some fairly good ones should be possible. Best bets are for openings toward Europe and toward the Caribbean and Latin America from the eastern half of the country, and toward the Far East, Australasia, the South Pacific, and Latin America from the western half of the country. DX openings to other areas of the world may also be possible. The best propagation aid for this band (and for 40 and 80 meters as well) is a set of sunrise and sunset tables, since DX signals tend to peak when it is *local sunrise* at the *easternmost* point of a path.

Contest Work Charts

The DX Propagation Charts on the following pages show the times when each amateur band from 10 through 160 meters is expected to open from each time zone

Time EST	Optimum Band (meters)	Areas To Which Band Is To Be Open
00–02	40	Most of Europe, Eastern Mediterranean, and Middle East. Most of Central and South America. A few African areas and possibly Antarctica.
02–04	20	Some South Pacific, New Zealand, and Australasia. A few Far East and Asian areas. Some South America and Antarctica.
04–06	40	South Pacific, New Zealand, Australasia. Many South American areas. A few Far Eastern and Asian areas. Possibly Antarctica.
06–08	20	Most of Europe, South Pacific, New Zealand, and Australasia. Most of Central and South America. A few African areas. Some Far East and Asian areas.
08–10	15	All of Europe, Eastern Mediterranean, and Middle East. Some of Africa. Most of Central and South America. South Pacific, New Zealand, and Australasia. A few Asian areas.
10–12	10	Most of Europe and Africa. Most of Central and South America. A few Asian areas, New Zealand, South Pacific, and Australasia.
12–14	15	Some of Europe and most of Africa. Most of Central and South America. A few areas of the South Pacific, New Zealand, and Australasia.
14–16	15	Most of Africa, and Central and South America. Some of South Pacific, New Zealand, and Australasia. A few Asian areas.
16–18	20	Most of Europe, Eastern Mediterranean, and Middle East. All of Africa, and Central and South America. A few Australasian areas.
18–20	15	Lots of South Pacific, New Zealand, and Australasia. Some of Far East and Asia. Most of Central and South America. Possibly Antarctica.
20–22	20	Most of Africa, Far East, South Pacific, New Zealand. Australasia, Central and South America. A few European areas and Middle East. Some Antarctica.
22–00	20	Lots of Far East, South Pacific, New Zealand, Australasia, Central and South America. A few African and Asian areas. Antarctica.

**Similar work plans can be devised for single-band operation or for openings to specific DX areas.*

Table II– Sample multi-band work plan for eastern U.S. QTH.

area in the continental U.S. to the major DX areas in the world. The information contained in the charts, while useful during the contest period in their present format, can easily be reorganized into more convenient formats to meet specific operational work plans or schedules. Experience gained during the previous 50 contests has shown that specifically tailored schedules derived from the charts can be extremely useful in piling up contacts and points with a minimum of wasted time.

Table II is an example of one of several types of plans that can be devised. It is a *multi-band* operational work plan which shows the times and bands when propagation conditions are expected to be optimum to various areas of the world for each two-hour period throughout the day. An Eastern QTH has been chosen for this example, but similar plans can be devised for Central and Western locations.

Useful Websites (URLs)

The internet can be a great asset during the CQ WW DX Contest. Real-time solar, geomagnetic, ionospheric, and HF propagation prediction information is at your fingertips, allowing you to better plan your on-the-air operation.

The following websites provide real-time data, forecasts, links to in-depth historical data, and graphical content.

N6RT Propagation Report: <http://dx.qsl.net/propagation/>. This page contains a dynamic collection of propagation information gathered from many different sources. It provides a quick view of real-time solar, geomagnetic, auroral, and ionospheric data. Updated many times an hour, it features storm warnings, a real-time MUF map, and a grey-line map.

The NW7US Propagation Center: <http://hfradio.org/propagation.html>. Another site providing live propagation information, this page includes a free subscription form for those who wish to have current propagation information e-mailed to them (useful during a contest if you have an e-mail-enabled pager, cell phone, or a computer next to your operating position). In addition to this eAlert service, you will find many links to educational resources covering the science of propagation, links to the many space and earth science resources found around the world, forecasts, and archived analyses and data.

D-Region Absorption Prediction: <http://sec.noaa.gov/rt_plots/dregion.html>. Long-range communications using high-frequency radio waves depend on reflection of the signals in the ionosphere. Along the path to the *F2* peak the radio-wave signal suffers attenuation due to absorption by the intervening ionosphere. The site shows current and forecast conditions of the ionospheric *D*-layer, which has direct influence on the ability of a contest signal to reach its destination.

160 meter Radio Propagation Prediction Table: <http://solar.spacew.com/ www/160pred.html>. Don't miss this page. It is based on selected high-latitude magnetic observatory data which is used to estimate the influence of the auroral oval on 160 meter path propagation (for details refer to the article "160 Meters: An Enigma Shrouded in Mystery," by Cary Oler and Ted Cohen, N4XX, in the March and April 1998 issues of *CQ*).

K1TTT MOF/LOF Propagation Program: <http://www.berkshire.net/~robbins/mofjava/mofjava.html>. This is a great online resource for anyone hoping to plan his or her HF activities. Plug in the live data (gained from the sites listed above) and see a map of the world showing the MOF and LOF (range of optimum frequencies) from the coordinates you provide. You can change the time of the map's forecast to gain a quick view of where the openings might be. It has various customizable features, and best of all it is a powerful utility available right on the web.

You can dial each URL directly, or you can find a collection of website links at my page, <http://www.gjainc.com>, including a link to IPS in Australia and the Royal Observatory of Belgium. If you do not have access to the World Wide Web (try a local library or school), solar flux, geomagnetic indices, and ionospheric reports can be obtained by calling 303-497-3235, where a recorded announcement is updates every three hours. Both the Space Environmental Center and the US Air Force Space Weather Program staff have asked that radio amateurs do not call their live phone lines, shown in last October's column, since staffing has been reduced and is now very limited. They encourage amateurs to either call the recorded line or use WWV (Fort Collins, Colorado) at 18 minutes past each hour. WWV transmits the solar and geomagnetic information, storm updates, and other items of concern to radio users. The frequencies are 2.5, 5, 10, 15, and 20 MHz. Sister station WWVH is located in Kauai, Hawaii and carries the same information at the same time on the same frequencies.

Fig. 1 is a do-it-yourself method for determining the quality of ionospheric propagation by using the solar flux values and geomagnetic indices that are provided by phone, radio, or the internet.

In upcoming months we will be watching the new NASA Genesis Mission launched on August 8, 2001. NASA's Genesis mission has launched its spacecraft to collect pieces of the sun, called solar wind. This may shed light on mysteries of the sun such as sunspots, solar flares, and radio storms. The Genesis spacecraft is journeying a million miles sunward, where it will unfold its collectors and "sunbathe" for nearly three years before returning to Earth with its precious cargo. Scientists will study the solar wind samples for years to come. Full details are available at the Genesis Mission Home Page: <http://genesismission. jpl.nasa.gov/>.

Radio Storms

The forecasts discussed in this column are based on *normal* propagation conditions expected with a sunspot level in the low 100s. If actual conditions during the contest turn out to be *above normal,* DX openings on 10, 15, and 20 meters are likely to be somewhat better than shown in the charts. On the other hand, if Mother Nature should play a trick and produce a radio storm during the contest period, expect conditions to drop to Below Normal or Disturbed to many areas of the world, depending on the storm's severity. The storm's influence generally will extend outward from the polar regions the more severe the storms becomes. Under storm conditions expect considerably fewer openings on 10, 15, and 20 meters, with weaker signals, increased fading, flutter fading, and higher noise levels. Paths passing through the polar regions and the upper latitudes are often more adversely affected than signals coming from mid and lower latitudes.

Conditions on 40, 80, and 160 meters are likely to become erratic as well. During certain types of storms conditions may actually improve at times for openings on all bands toward southern and tropical areas, and on 40, 80, and 160 meters during the hours of darkness.

If a radio storm should develop, concentrate on working transpolar paths on 10, 15, and 20 meters during the daylight hours. Check the 40, 80, and 160 meter bands for possible openings to some areas of the world during the hours of darkness.

October VHF Report

(Partially provided by Ken Neubeck, WB2AMU)

Conditions during October will start to get pretty interesting for the VHF bands compared to the slow activity that was seen in September. It is very likely that this year will be the last fall season of Cycle 23 in which *F2* will be heard on 6 meters in the Northern Hemisphere due to the gradual decline of the sunspot count and associated solar flux values. During October *F2* activity on 6 meters primarily will be in a north-south direction—i.e., the U.S. into the Caribbean or Central America, and western Europe into parts of Africa.

There will be some moderate levels of transequatorial propagation (TE) in which stations in south Florida, southern Texas,

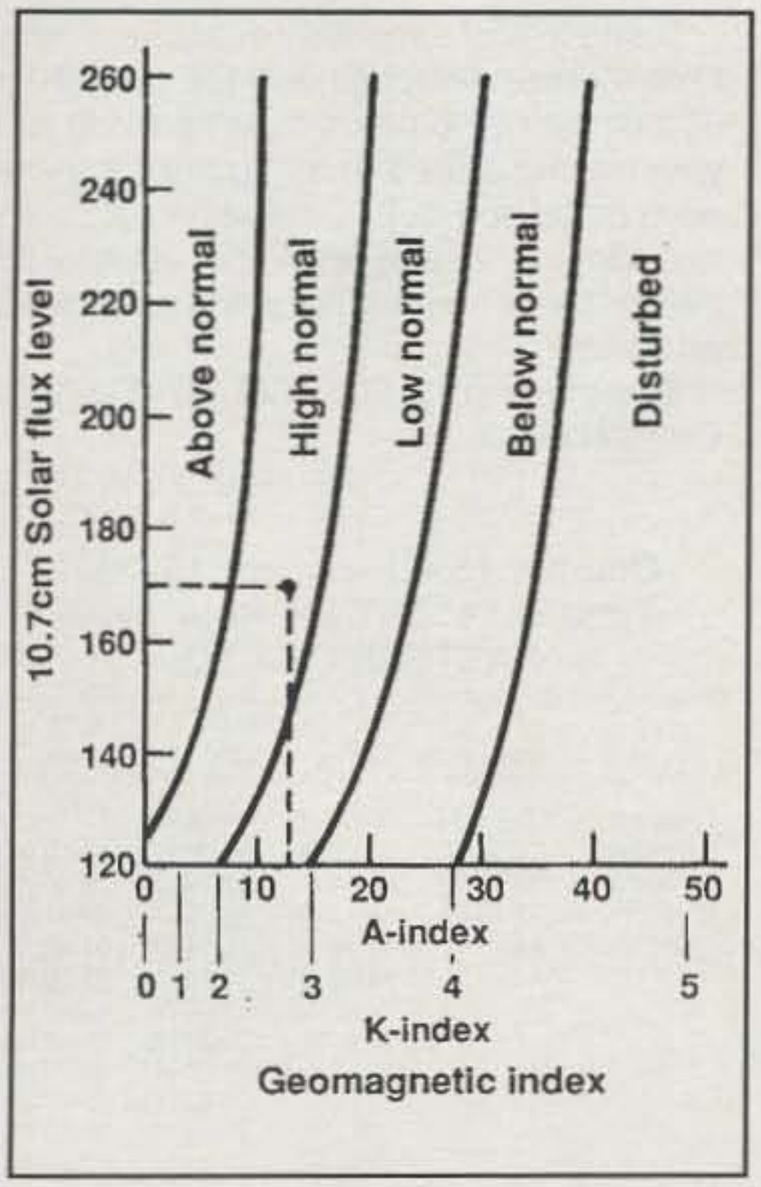

Fig. 1– Intersection of the given values of solar flux and geomagnetic activity determine expected HF ionospheric propagation conditions (i.e., solar flux is 170 and A-index is 13; expect High Normal conditions).

and parts of the Caribbean will be able to work into Argentina and Uruguay during the late afternoons. During the peak years of the sunspot cycle October is one of the better months for TE activity, particularly during the latter part of the month.

Sporadic-*E* activity during October is relatively sparse for the northern temperate zone (where much of the U.S. is located). However, one or two sporadic-*E* openings may be experienced at the end of the month. If one of these sporadic-*E* openings should link to a TE or *F2* opening toward the south, it becomes possible for East Coast stations to work into Argentina, or possibly even into Australia! Stations in the northern part of the U.S. should keep a close eye on 6 meters during the afternoon hours in the latter part of October for this possibility.

Because the geomagnetic activity is higher during the equinox periods due to the position of the Earth relative to the sun, there will be some aurora activity in the higher latitudes of the Northern Hemisphere (primarily Alaska and Canada), as well as the higher latitudes of the northern temperate zone. Typically, one or two strong events will occur during October, so aurora activity on 6 meters, 2 meters, and sometimes 432 MHz may be experienced. Remember that CW is the best way to go with aurora, particularly on 2 meters and 432 MHz, as the voice modes become extremely distorted and unrecognizable due to the effects of the aurora. The best times to check for VHF auroral openings are when conditions on the HF bands are expected to be Below Normal or Disturbed, as shown in the Last-Minute Forecast at the beginning of this column.

There is some possibility of extended tropospheric conditions during October because of changing weather patterns. Two meters is the best band to watch for this. Alert operators should be able to pick up stations up to 300 miles away when this type of opening occurs.

A major meteor shower, which could produce meteor-reflection-type ionospheric openings on the VHF bands, is expected October 20–22. Called the *Orionids*, the shower could reach peak intensity on October 21, with an hourly meteor count of approximately 25. Peaks in minor meteor showers are expected on October 9 and 19.

WARC Bands

While the WARC bands are not yet included in the CQ WW DX Contest, expect 12 meter openings during the same time periods for 10 meters, but with the band opening a bit more frequently than 10 meters. Seventeen meters should behave much

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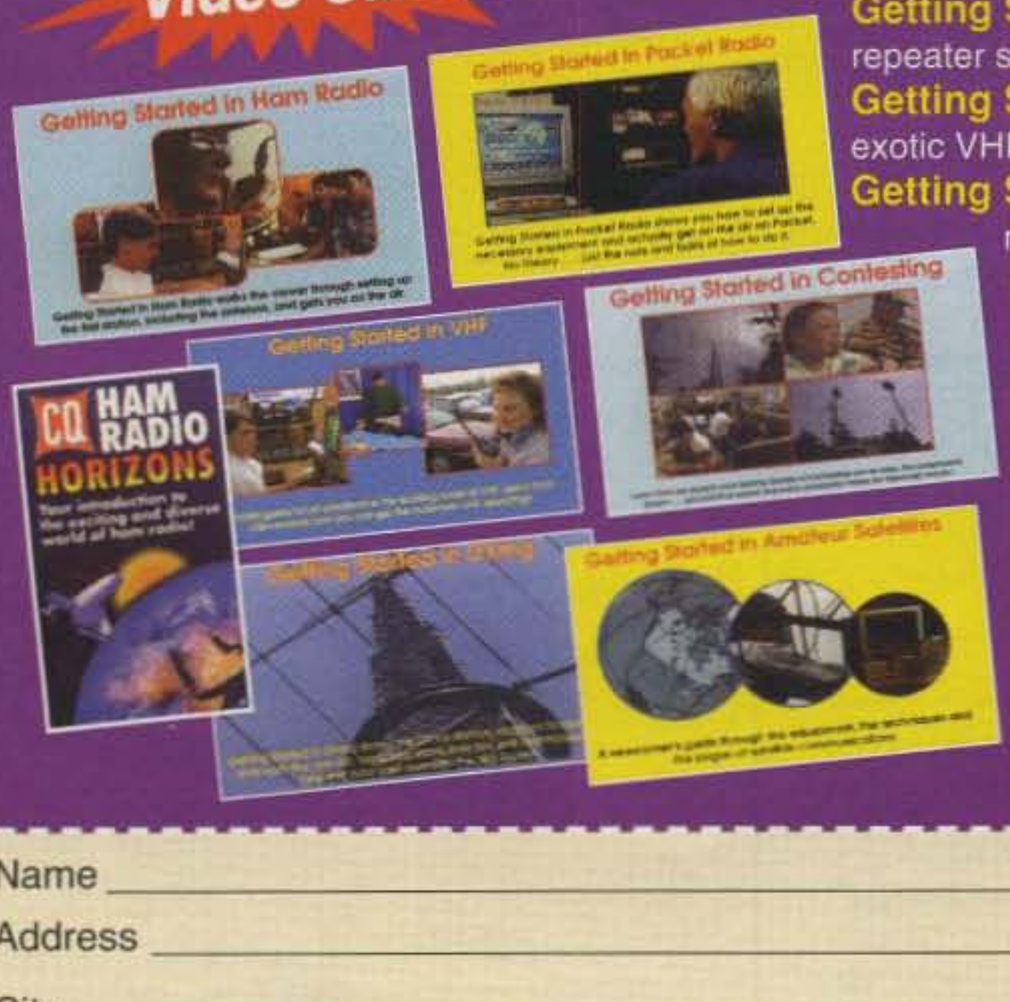

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HOW TO USE THE DX PROPAGATION CHARTS

1. Use chart appropriate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8, KP4, KG4, and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9, and 0 areas; the Western USA Chart in the 6 and 7 areas; and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 meters) for a particular DX region, as shown in the left-hand column of the charts. An * indicates the best time to listen for 160 meter openings.

3. The propagation index is the number that appears in ( ) after the time of each predicted opening. The index indicates the number of days during the month on which the opening is expected to take place as follows:

(4) Opening should occur on more than 22 days
(3) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific *propagation index* is likely to occur, and the signal quality that can be expected.

4. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. Appropriate *standard* time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 8 hours in PST Zone, 7 hours in MST Zone, 6 hours in CST Zone, and 5 hours in EST Zone. For example, 13 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 04 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts CW, or 1 kw, PEP on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the *propagation index* will increase by one level; for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce, Boulder, Colorado 80302.

as shown for 15 meters. Openings on 30 meters should resemble 40 meter openings during local sunrise and sunset times, but the band is expected to open less frequently than 40 meters during the hours of darkness.

CW Contest Forecast

This month's DX Propagation Charts are valid for both the SSB and CW sections of the contest. Be sure to keep them handy for use during next month's CW section as well. Short-Skip Propagation Charts for use during October appeared last month.

The New Shortwave Propagation Handbook makes an excellent companion during the CQ WW DX Contest. It contains a considerable amount of additional information concerning propagation, radio storms, do-it-yourself forecasting, and computer propagation programs. Copies may be obtained from *CQ* by calling 1-800-853-9797 ($19.95 plus $4.00 s/h).

Experience from the past 50 contest years has shown that DX contests are excellent periods in which to test the accuracy of prediction and forecast methods used in this column. Contests generate a lot of activity in every corner of the world and on all HF bands. Previous results and observations have helped considerably in improving the accuracy of this column. Comments concerning the 2001 contest and the accuracy of these forecasts and predictions would be appreciated and should be sent to W3ASK at 8701 Georgia Ave. Suite 711, Silver Spring, MD 20910, or via e-mail to <george@gjainc.com>.

A Personal Note

Beginning with the January 2002 issue there will be a new editor of this column. Tomas (pronounced *Thomas*) Hood, NW7US, comes to this position with an excellent background and with more than 25 years of solid experience in HF communications and propagation. Check out his website at <http://hfradio.org> to learn more about his professional and amateur radio experiences.

I am continuing as Dean of the *CQ* Editorial staff. I will still have a hand in this column, assisting Tomas during a transitional period and helping with the preparation of the propagation charts.

Being free of a monthly deadline, which I have observed religiously for more than 600 consecutive months, will provide me with much needed extra time to prepare occasional non-deadline special HF propagation articles and articles of a nostalgic nature based on my 60 years as a radio amateur.

Good luck in the 2001 CQ WW DX SSB Contest weekend!

73, George, W3ASK

October 15 - December 15, 2001
Time Zone: EST (24-Hour Time)
EASTERN USA TO:

	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Central Europe & North Africa	06-07 (1) 07-08 (3) 08-13 (4) 13-14 (3) 14-15 (1)	06-07 (1) 07-08 (3) 08-14 (4) 14-15 (3) 15-16 (2) 16-17 (1)	04-06 (2) 06-09 (4) 09-10 (3) 10-12 (2) 12-14 (3) 14-18 (4) 18-20 (3) 20-22 (2) 22-00 (1) 00-02 (2) 02-04 (3)	16-17 (1) 17-18 (2) 18-20 (3) 20-01 (4) 01-02 (3) 02-03 (2) 03-04 (1) 19-21 (1)* 21-23 (2)* 23-01 (3)* 01-02 (2)* 02-03 (1)*
Northern Europe & European CIS	06-07 (1) 07-08 (2) 08-09 (3) 09-11 (4) 11-12 (2) 12-13 (1)	06-07 (1) 07-08 (3) 08-13 (4) 13-14 (3) 14-15 (1)	04-06 (1) 06-07 (2) 07-09 (3) 09-11 (2) 11-17 (3) 17-19 (4) 19-21 (3) 21-23 (2) 23-01 (3) 01-04 (2)	17-19 (1) 19-02 (2) 02-04 (1) 20-03 (1)*
Eastern Mediterranean & Middle East	07-08 (1) 08-09 (3) 09-13 (4) 13-14 (3) 14-15 (1)	06-07 (1) 07-08 (3) 08-10 (4) 10-13 (3) 13-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	07-12 (1) 12-15 (2) 15-17 (3) 17-22 (4) 22-00 (3) 00-01 (2) 01-03 (1)	18-20 (1) 20-22 (2) 22-00 (3) 00-01 (2) 01-02 (1) 20-00 (1)*
Western Africa	06-07 (1) 07-12 (3) 12-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	04-05 (1) 05-07 (2) 07-14 (3) 14-20 (4) 20-22 (3) 22-00 (2) 00-01 (1)	03-04 (3) 04-06 (2) 06-13 (1) 13-15 (2) 15-17 (3) 17-03 (4)	18-22 (1) 22-01 (2) 01-03 (1) 00-03 (1)*
Eastern & Central Africa	07-08 (1) 08-09 (2) 09-12 (3) 12-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	06-07 (1) 07-09 (3) 09-13 (2) 13-15 (3) 15-18 (4) 18-19 (3) 19-22 (2) 22-00 (1)	03-05 (2) 05-09 (1) 12-14 (1) 14-16 (2) 16-17 (3) 17-01 (4) 01-03 (3)	19-22 (1) 22-00 (2) 00-01 (1) 22-00 (1)*
Southern Africa	07-08 (1) 08-10 (3) 10-14 (4) 14-16 (3) 16-17 (2) 17-18 (1)	06-08 (1) 08-11 (2) 11-13 (3) 13-16 (4) 16-18 (3) 18-20 (2) 20-22 (1)	06-09 (1) 11-14 (1) 14-15 (2) 15-17 (3) 17-21 (4) 21-02 (3) 02-05 (2)	18-19 (1) 19-22 (2) 22-23 (1) 19-21 (1)*
Central & South Asia	08-09 (1) 09-10 (2) 10-11 (1) 20-22 (1)	07-08(1) 08-10 (2) 10-11 (1) 18-20 (1) 20-22 (2) 22-00 (1)	06-07 (1) 07-09 (3) 09-10 (2) 10-11 (1) 18-20 (1) 20-21 (2) 21-23 (3) 23-00 (2) 00-01 (1)	18-21 (1) 06-08 (1)
Southeast Asia	10-12 (1) 12-14 (2) 14-15 (1) 17-18 (1) 18-20 (2) 20-21 (1)	09-10 (1) 10-12 (2) 12-13 (1) 17-18 (1) 18-19 (2) 19-21 (3) 21-22 (2) 22-23 (1)	02-06 (1) 06-09 (2) 09-11 (1) 18-21 (2) 21-23 (1)	18-20 (1) 05-07 (1)

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South Pacific & New Zealand	09-12 (1) 12-14 (2) 14-16 (3) 16-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	08-09 (1) 09-11 (2) 11-15 (1) 15-17 (2) 17-18 (3) 18-20 (4) 20-21 (3) 21-23 (2) 23-00 (1)	13-19 (1) 19-21 (2) 21-22 (3) 22-02 (4) 02-04 (3) 04-07 (2) 07-10 (3) 10-13 (2)	00-02 (1) 02-03 (2) 03-07 (3) 07-08 (2) 08-09 (1) 03-04 (1)* 04-07 (2)* 07-08 (1)*
Australasia	08-09 (1) 09-11 (2) 11-12 (1) 14-16 (1) 16-17 (2) 17-18 (2) 18-19 (4) 19-20 (2) 20-21 (1)	07-08 (1) 08-11 (2) 11-16 (1) 16-17 (2) 17-18 (3) 18-20 (4) 20-22 (3) 22-23 (2) 23-00 (1)	07-08 (3) 08-10 (4) 10-11 (3) 11-12 (2) 12-14 (1) 17-19 (2) 21-23 (1) 23-00 (2) 00-01 (3) 01-03 (4) 03-04 (3) 04-07 (2)	03-05 (1) 05-07 (2) 07-08 (1) 05-07 (1)*
Caribbean, Central America & Northern Countries of South America	07-08 (2) 08-11 (4) 11-13 (3) 13-18 (4) 18-19 (3) 19-20 (2) 20-21 (1)	06-07 (1) 07-08 (3) 08-11 (4) 11-13 (3) 13-20 (4) 20-21 (3) 21-23 (2) 23-01 (1)	07-09 (4) 09-11 (3) 11-14 (2) 14-16 (3) 16-02 (4) 02-03 (3) 03-06 (2) 06-07 (3)	18-19 (1) 19-21 (3) 21-04 (4) 04-06 (2) 06-07 (1) 19-21 (1)* 21-03 (2)* 03-05 (1)
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	06-07 (1) 07-09 (4) 09-11 (3) 11-15 (2) 15-16 (3) 16-20 (4) 20-21 (2) 21-22 (1)	06-07 (1) 07-09 (4) 09-11 (3) 11-15 (2) 15-17 (3) 17-22 (4) 22-23 (3) 23-00 (2) 00-01 (1)	06-08 (2) 08-11 (1) 14-16 (1) 16-17 (2) 17-19 (3) 19-02 (4) 02-03 (3) 03-05 (2) 05-06 (3)	20-23 (1) 23-04 (2) 04-06 (1) 23-04 (1)*
McMurdo Sound, Antarctica	16-17 (1) 17-19 (2) 19-20 (1)	15-17 (1) 17-18 (2) 18-21 (3) 21-22 (2) 22-23 (1)	16-18 (1) 18-21 (1) 21-22 (2) 22-03 (3) 03-05 (2) 05-07 (1) 07-09 (2) 09-10 (1)	00-06 (1)

Time Zones: CST & MST (24-hour time) CENTRAL USA TO:

	10 Meters	*15 Meters*	*20 Meters*	*40-80 Meters*
Western & Southern Europe & North Africa	06-07 (1) 07-08 (3) 08-11 (4) 11-12 (3) 12-13 (2) 13-14 (1)	06-07 (1) 07-08 (3) 08-12 (4) 12-13 (3) 13-14 (2) 14-15 (1)	03-06 (1) 06-08 (3) 08-12 (2) 12-14 (3) 14-16 (4) 16-18 (3) 18-20 (2) 20-00 (1) 00-03 (2)	17-18 (1) 18-20 (2) 20-23 (3) 23-01 (2) 01-02 (1) 19-20 (1)* 20-23 (2)* 23-00 (1)*
Northern & Central Europe & European CIS	06-07 (1) 07-08 (2) 08-10 (3) 10-11 (2) 11-12 (1)	06-07 (1) 07-08 (3) 08-11 (4) 11-12 (3) 12-13 (2) 13-14 (1)	02-06 (1) 06-07 (2) 07-09 (3) 09-11 (2) 11-16 (3) 16-17 (4) 17-19 (3) 19-20 (2) 20-22 (1) 22-02 (2)	18-20 (1) 20-23 (2) 23-01 (1) 20-23 (1)*
Eastern Mediter-ranean & Middle East	07-08 (1) 08-09 (2) 09-12 (3) 12-13 (2) 13-14 (1)	06-07 (1) 07-08 (2) 08-11 (3) 11-12 (4) 12-13 (3) 13-14 (2) 14-15 (1)	06-07 (1) 07-09 (2) 09-11 (1) 11-13 (2) 13-16 (3) 16-18 (4) 18-20 (3) 20-22 (2) 22-00 (1)	17-19 (1) 19-22 (2) 22-23 (1) 20-22 (1)*
Western Africa	06-07 (1) 07-11 (3)	05-06 (1) 06-10 (2)	05-12 (1) 12-15 (2)	17-19 (1) 19-21 (2)

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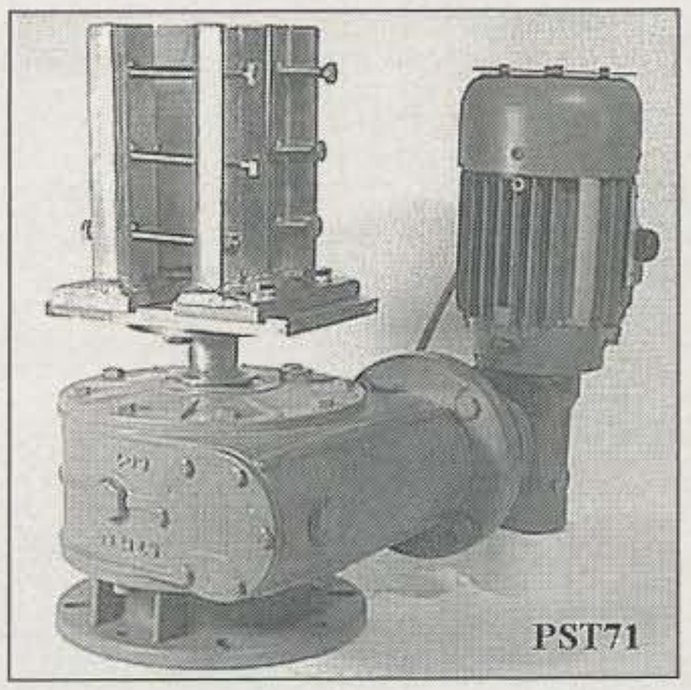

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Eastern & Central Africa	07-09 (1) 09-11 (2) 11-15 (3) 15-16 (2) 16-17 (1)	06-07 (1) 07-12 (2) 12-15 (3) 15-17 (4) 17-18 (3) 18-20 (2) 20-21 (1)	06-14 (1) 14-16 (2) 16-19 (3) 19-21 (4) 21-23 (3) 23-00 (2) 00-02 (1)	20-00 (1) 21-23 (1)*
Southern Africa	07-08 (1) 08-09 (2) 09-11 (3) 11-14 (4) 14-15 (3) 15-16 (2) 16-17 (1)	06-07 (1) 07-10 (2) 10-12 (3) 12-15 (4) 15-17 (3) 17-18 (2) 18-20 (1)	06-13 (1) 13-15 (2) 15-17 (3) 17-20 (4) 20-23 (3) 23-02 (2) 02-04 (1)	18-19 (1) 19-21 (2) 21-22 (1) 19-21 (1)*
Central & South Asia	07-08 (1) 08-10 (2) 10-11 (1) 18-19 (1) 19-21 (2) 21-22 (1)	06-07 (1) 07-10 (2) 10-11 (1) 17-18 (1) 18-19 (2) 19-21 (3) 21-22 (2) 22-23 (1)	04-06 (1) 06-07 (2) 07-09 (3) 09-10 (2) 10-11 (1) 17-18 (1) 18-19 (2) 19-21 (3) 21-23 (2) 23-02 (1) 02-04 (2)	18-20 (1) 06-08 (1)
Southeast Asia	07-08 (1) 08-09 (2) 09-10 (3) 10-11 (2) 11-13 (1) 15-16 (1) 16-19 (2) 19-20 (1)	07-08 (1) 08-09 (2) 09-10 (3) 10-12 (2) 12-13 (1) 16-17 (1) 17-18 (2) 18-20 (3) 20-21 (2) 21-22 (1)	06-07 (1) 07-10 (2) 10-12 (1) 18-19 (1) 19-21 (2) 21-23 (1)	04-07 (1)
Far East	15-16 (1) 16-19 (3) 19-20 (2)	08-10 (1) 15-16 (1) 16-17 (3)	04-05 (1) 05-07 (2) 07-09 (3)	02-03 (1) 03-07 (2) 07-09 (1)

Looking Ahead in

Here are some of the articles that we're working on for upcoming issues of *CQ:*

- "80-Meter DX: The Moon Effect," by W7DD
- "*CQ* Interviews: Leo Meyerson, WØGFQ," by N4XX
- "Footsteps of Wireless History," by N7XM
- "A Motorized Clothesline Antenna," by VA2ERY

Plus:

- "CQ Reviews: Cushcraft MA5B HF Mini Beam," by WB6NOA
- "Results: 2000 CQ World-Wide DX 160 Meter Contest," by K4JRB

	20-21 (1)	17-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	09-10 (2) 10-11 (1) 17-19 (1) 19-20 (2) 20-22 (3) 22-23 (2) 23-00 (1)	03-06 (1)*
South Pacific & New Zealand	09-12 (1) 12-13 (2) 13-15 (3) 15-18 (4) 18-19 (3) 19-20 (2) 20-21 (1)	08-11 (1) 11-13 (3) 13-16 (2) 16-17 (3) 17-20 (4) 20-21 (3) 21-22 (2) 22-23 (1)	11-17 (1) 17-18 (2) 18-20 (3) 20-01 (4) 01-03 (3) 03-07 (2) 07-09 (4) 09-10 (3) 10-11 (2) 11-12 (2)	23-01 (1) 01-02 (2) 02-07 (3) 07-08 (2) 08-09 (1) 00-02 (1)* 02-07 (2)* 07-08 (1)*
Australasia	08-09 (1) 09-11 (2) 11-13 (1) 13-15 (2) 15-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-21 (1)	06-08 (1) 08-09 (3) 09-11 (2) 11-12 (1) 16-18 (1) 18-19 (2) 19-20 (4) 20-21 (3) 21-22 (2) 22-23 (1)	06-07 (2) 07-09 (4) 09-10 (3) 10-11 (2) 11-12 (1) 15-17 (1) 20-22 (1) 22-00 (2) 00-04 (3) 04-06 (1)	02-04 (1) 04-07 (2) 07-08 (1) 03-04 (1)* 04-06 (2)* 06-07 (1)*
Caribbean, Central America & Northern Countries of South America	06-07 (1) 07-08 (3) 08-10 (4) 10-12 (3) 12-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	05-06 (1) 06-07 (2) 07-08 (3) 08-10 (4) 10-13 (3) 13-18 (4) 18-19 (3) 19-21 (2) 21-23 (1)	06-07 (3) 07-09 (4) 09-11 (3) 11-14 (2) 14-16 (3) 16-00 (4) 00-02 (3) 02-06 (2)	18-19 (1) 19-21 (3) 21-03 (4) 03-05 (2) 05-07 (1) 19-21 (1)* 21-02 (2)* 02-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina, & Uruguay	06-07 (1) 07-08 (3) 08-10 (4) 10-14 (3) 14-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	05-06 (1) 06-07 (2) 07-09 (3) 09-13 (2) 13-15 (3) 15-20 (4) 20-21 (3) 21-23 (2) 23-00 (1)	04-06 (1) 06-08 (2) 08-14 (1) 14-16 (2) 16-18 (3) 18-00 (4) 00-02 (3) 02-04 (2)	19-21 (1) 21-01 (2) 01-03 (1) 03-04 (2) 04-06 (1) 21-05 (1)*
McMurdo Sound, Antarctica	07-08 (1) 08-09 (2) 09-10 (1) 17-18 (1) 18-20 (2) 20-21 (1)	06-07 (1) 07-09 (2) 09-10 (1) 14-16 (1) 16-18 (2) 18-22 (3) 22-23 (2) 23-00 (1)	06-08 (2) 08-09 (1) 16-18 (1) 18-20 (2) 20-02 (3) 02-04 (2) 04-06 (1)	23-05 (1)

Time Zone: PST (24-hour time)
WESTERN USA TO:

	10 Meters	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Southern Europe & North Africa	06-07 (1) 07-08 (2) 08-11 (3) 11-12 (2) 12-13 (1)	06-07 (1) 07-08 (2) 08-10 (3) 10-12 (4) 12-13 (2) 13-14 (1)	05-06 (1) 06-08 (2) 08-10 (1) 10-12 (2) 12-14 (4) 14-16 (3) 16-18 (2) 18-20 (1) 23-01 (2)	18-20 (1) 20-22 (2) 22-00 (1) 19-23 (1)*
Central & Northern Europe & European CIS	07-08 (1) 08-10 (2) 10-11 (1)	06-07 (1) 07-08 (2) 08-10 (3) 10-11 (2) 11-12 (1)	05-07 (1) 07-09 (3) 09-10 (2) 10-14 (1) 14-17 (3) 17-19 (2) 19-23 (1) 23-02 (2) 02-03 (1)	18-20 (1) 20-22 (2) 22-23 (1) 19-22 (1)*
Eastern Mediter-ranean & Middle East	07-08 (1) 08-10 (2) 10-11 (1)	06-07 (1) 07-08 (2) 08-10 (3) 10-11 (2) 11-12 (1)	06-07 (1) 07-10 (2) 10-14 (1) 14-16 (2) 16-18 (1) 18-20 (2) 20-22 (1) 00-02 (1)	18-22 (1) 06-08 (1)
Western Africa	06-07 (1) 07-08 (2) 08-11 (3) 11-13 (4) 13-15 (3) 15-16 (2) 16-17 (1)	05-06 (1) 06-07 (2) 07-13 (3) 13-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	05-10 (1) 10-14 (2) 14-15 (3) 15-20 (4) 20-22 (3) 22-02 (2) 02-03 (1)	18-19 (1) 19-21 (2) 21-22 (1) 19-21 (1)*
Eastern & Central Africa	07-08 (1) 08-10 (2) 10-14 (3) 14-15 (2) 15-16 (1)	06-08 (1) 08-12 (2) 12-16 (3) 16-17 (2) 17-19 (1)	06-14 (1) 14-16 (2) 16-22 (3) 22-23 (2) 23-00 (1)	18-21 (1) 06-08 (1)
Southern Africa	07-08 (1) 08-10 (3) 10-14 (4) 14-15 (3) 15-16 (2) 16-17 (1)	06-10 (1) 10-12 (2) 12-13 (3) 13-16 (4) 16-17 (3) 17-19 (2) 19-21 (1)	06-12 (1) 12-14 (2) 14-16 (3) 16-19 (4) 19-22 (3) 22-01 (2) 01-03 (1)	17-19 (1) 19-20 (2) 20-21 (1) 06-08 (1) 18-19 (1)*
Central & South Asia	16-17 (1) 17-19 (3) 19-20 (1) 07-09 (1)	16-17 (1) 17-19 (3) 19-20 (2) 20-21 (1) 07-09 (1)	06-07 (1) 07-09 (3) 09-10 (2) 10-11 (1) 16-17 (1) 17-19 (3) 19-21 (2) 21-22 (1)	17-19 (1) 04-09 (1)
Southeast Asia	08-09 (1) 09-10 (3) 10-11 (4) 11-12 (3) 12-13 (2) 13-14 (1) 14-15 (2) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	07-08 (1) 08-11 (3) 11-12 (2) 12-15 (1) 15-17 (3) 17-19 (2) 19-21 (3) 21-22 (2) 22-23 (1)	06-07 (1) 07-08 (2) 08-10 (3) 10-11 (2) 11-12 (1) 19-22 (1) 22-01 (2) 01-03 (3) 03-06 (2)	02-03 (1) 03-06 (2) 06-08 (1) 03-06 (1)*
Far East	13-14 (1) 14-15 (3) 15-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	07-08 (1) 08-09 (2) 09-11 (3) 11-13 (2) 13-15 (3) 15-17 (2) 17-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	06-07 (1) 07-08 (2) 08-10 (4) 10-12 (3) 12-14 (2) 14-18 (1) 18-20 (2) 20-21 (3) 21-23 (4) 23-02 (3)	23-01 (1) 01-05 (2) 05-07 (3) 07-08 (1) 01-05 (1)* 05-06 (2)* 06-07 (1)*
South Pacific & New Zealand	08-09 (1) 09-10 (2) 10-19 (4) 19-21 (3) 21-23 (2) 23-00 (1)	07-08 (1) 08-11 (4) 11-18 (3) 18-00 (4) 00-02 (3) 02-03 (2) 03-04 (1)	11-18 (1) 18-19 (2) 19-21 (3) 21-04 (4) 04-07 (3) 07-09 (4) 09-10 (3) 10-11 (2)	21-22 (1) 22-00 (2) 00-07 (3) 07-08 (2) 08-09 (1) 22-00 (1)* 00-06 (2)* 06-07 (1)*
Australasia	09-11 (1) 11-12 (2) 12-14 (4) 14-18 (3) 18-20 (4) 20-21 (3) 21-22 (2) 22-23 (1)	07-08 (1) 08-12 (3) 12-14 (2) 14-18 (1) 18-20 (2) 20-21 (3) 21-00 (4) 00-01 (3) 01-02 (2) 02-03 (1)	18-20 (1) 20-22 (2) 22-00 (3) 00-04 (4) 04-07 (3) 07-09 (4) 09-10 (3) 10-12 (2) 12-14 (1)	02-03 (1) 03-04 (2) 04-07 (3) 07-08 (1) 03-04 (1)* 04-06 (2)* 06-07 (1)*
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For 30 meter openings interpolate between 40 and 30 meter openings.

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Our Readers Say

Lies, Myths, and Marketing

Editor, *CQ:*

...sorry, not a marketing wizard, just a geek engineer.

But you know, I think some of us have one of the best marketing tools available for ham radio—HF mobile stations. I have been HF mobile for nearly two years now, and I honestly must get at *least* two inquiries a month from the public, both friends and total strangers who come up to me in parking lots, etc., and ask, "What's that thing on your truck? An antenna of some sort?"

- people at my place of employment
- people at our vendors' places of employment
- the Forest Service park ranger last time I went camping with the family
- parking lot at the local mall
- parking lot at my kids' elementary school (kids and adults!)
- freeway rest areas
- one of the hotel maintenance personnel at the Holiday Inn in Visalia, CA, during the Int'l DX Convention last April (how he picked me out of that crowd I'll never know...I thought I was being tested by an undercover agent of the ARRL since the Prez was there!).

I get the entire range of initial questions from "is it CB?"; "how far can you talk"; etc. I have taken the time in each case to explain what amateur radio is, what it can do, and why I do it. I am not a sales person or an extrovert—remember, I'm a geek engineer—but it took those people some courage to ask a total stranger a question, so at the very least common courtesy requires that I give them a meaningful response. I now carry "What is Amateur Radio?" flyers in my truck. How could I not?

The HF mobileers have something of a visibility advantage over generic FM mobile stations since the antennas are bigger (usually at least...I use a High Sierra screwdriver and it's pretty visible). In my particular case the antenna count is pretty high (screwdriver, whip for 6m, whip for 2m/440 FM, loop for 2m, loop for 70cm) so that probably helps. But with the little radios and the great antennas we have to choose from today, there are more and more of us with this opportunity to show off ham radio. I'll bet there are others out there like me who have had the same experiences. Maybe this aspect of HF mobiling is a topic for the next mobile column (can't recall what it's called...).

Scott Townley, NX7U
Gilbert, AZ

Scott: You can't remember the name of our mobile column because we don't have one at the moment (although Dave Ingram, K4TWJ, regularly devotes several of his "World of Ideas" columns each year to the topic). However, we do have a Mobile Special issue—this issue—and you've made this aspect of HF mobiling a topic for this one! Tnx.

Editor, *CQ:*

Wow! I think you are right on the money (August 2001 "Zero Bias"). The people who would get the most from and have the most to contribute to our hobby are most likely the ones who want something that is a challenge. If they don't have time for the challenge, they won't have time for the hobby anyway. When I decided to get my Technician license, I bought a study book at Radio Shack. I was fortunate at work to be able to read it and study it while the machine I run had long cycle times. Some of it was refresher but some of it was all new. I probably spent about 20 hours in one week just reading and reviewing that book. I basically memorized the material. My next goal is Morse code, but that may have to wait until I get through with college.

Eugene McMahon
via e-mail

Looking for More...

Editor, *CQ:*

I have been planning to purchase a new HF radio and have been spending a lot of time on research into various rigs. I was delighted last night when I was flipping through my back issues of *CQ* and found a survey of HF radios article in an issue (March 2001). However, my delight was short lived. I found the comments on each rig to be simply a summary of some of the features of each rig. Okay, it was a "survey" article, not a "review" article; I can understand that. However, in the table that listed the features of all of the rigs grouped by price range, there was a column labeled simply "DSP" and each rig was listed as either "Yes" or "No."

If I recall correctly, Gordon West wrote this article, and I am sure he knows that there is a big difference between audio DSP and IF DSP. Many of the rigs listed as having DSP have only audio DSP. A few have IF DSP. There was no distinction made. In addition, there was no mention of traditional Collins IF filters. For example, the IC-746 has both IF DSP and capability to add IF filters. This is a great combination. Anyone who has used a rig with IF DSP without traditional filters knows that the IF DSP is nice (if it is done properly) but even the best are no substitute for good traditional filters. Anyone who has used a rig with audio DSP will surely admit that it is no substitute for good IF filters. I think the article should have made a distinction between audio DSP and IF DSP and should have included traditional filter capability as well.

Jim Proctor, KE3HO
via e-mail

Jim: As you pointed out, the article is a survey of all the rigs currently on the market and not a review of any one in particular, so we did not go into depth on any of the radios. We do appreciate your suggestion to differentiate between AF and IF DSP, however, and will pass it along to WB6NOA for consideration in next year's version, space permitting.

Need More Ads!!

Editor, *CQ:*

I suppose I am going to sound like an advertising representative posing as a customer, but I really do read all (ALL) of the ad's in your magazine *before* I read anything else. Even the small ones with web site information. I make a list of the websites and check them out. There are NOT enough ads in *CQ*. Let your paid advertisers know that we are reading their ads.

Because I am a new ham, I learn as much from the ads sometimes as reading everything else. (Okay, I love gadgets too.) I enjoy your magazine, and look forward to each issue.

Jim McNamara, KG6CDR

Jim: You are right on target. I, too, learn quite a bit from reading our ads. Unfortunately, we can't force people to buy advertising, and in a tight economy, as we're in now, ad budgets are often among the first things cut. Your message is important, though, in reminding the manufacturers and dealers that their messages are important to you, the reader. Thank you.

N6CL—A Pro

The following was directed to "VHF Plus" Editor Joe Lynch, N6CL:

Dear Joe:

I want to commend you for your response to Jim Shepherd's chiding ("Why CW Forever," July issue). You handled the issue very diplomatically, informatively, and objectively. I doubt that I could have done so without a lot of excess stomach acid working its way up into my craw. It's articles like yours, written by pros like you that make me keep resubscribing to *CQ*.

Keep up the good work! And though I don't get a lot of time to work CW, I do consider it a good standby in any band when conditions don't permit SSB traffic.

73, K7LK

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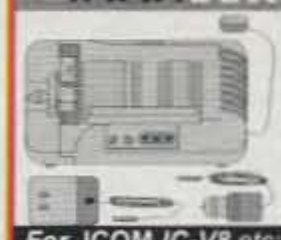

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